THE IRON TRADE REVIEW

VOLUME XL. CLEVELAND, FEBRUARY 14, 1907. NUMBER 7

CALLING A HALT

ON ADVANCES OF PRICES OF FINISHED PRODUCTS

To Danger Point, Has Effect on Pig Iron Market, and Concessions are Being Made.—Steel Makers not Buying Pig.

Interest still centers in the pig iron market, but the indications of lower prices on pig iron are closely connected with conditions in finished lines. In spite of the present great activity of the mills, leading manufacturing interests are firmly of the opinion that further advances in finished products will decrease consumption and imperil a continuance of prosperity. The effect of this influence is clearly shown in the positive stand of leading steel makers, especially in the central west, against further purchasing of Bessemer and basic iron, unless the price is reduced to about $20.00. Steel makers declare that they cannot dispose of their product at a profit at prevailing prices of pig iron, and that there is no prospect of the price of crude steel being advanced. Valley interests have sold practically no steel making iron for the last half of the year, and a fair tonnage for second quarter is still to be disposed of. The furnaces are not inclined, at present, to accept offers of $20.00 for their iron, and are willing to await developments.

Prices Tend Downward. Notwithstanding the fact that some interests will not make concessions, there is a general tendency toward lower prices in pig iron, due to some extent to the persistent and determined efforts of buyers to break the market. The position of the leading producers in the south is strong, and sales have recently been made at $18.50 for No. 2 Birmingham for the last half of the year, but $18.00 is now freely taken for desirable business. Some concessions are also being made by northern furnaces. An Ashland, Ky., interest has sold malleable as low as $20.00, but the conditions were rather unusual, as the company only recently covered for ore requirements for the last half of the year, and was anxious to obtain orders for all the iron which it expects to make after the first half. In the east, the pig iron situation seems somewhat stronger at present than in the west, and dealers have no fear that foreign iron will have much effect on the market. The lowest prices named for foreign iron at tidewater are $25.50 for Scotch, duty paid, and $23.00 for Middlesborough No. 1, duty paid.

The Car Shortage. The southern car situation does not improve, and in the east there has also been much difficulty in obtaining delivery during the extremely cold days of the past week. One large plant of the leading pipe interest was compelled to close temporarily for lack of iron, although it had 100 cars in transit.

Sheets are Very Strong. In sheets the market is strong and independent interests are obtaining premiums of $1.50 to $2.00 per ton. Jobbers, who were compelled to pay premiums for their supplies, have, in some cases, advanced prices $3.00 per ton. Plates are very strong, and some Pennsylvania mills are still able to sell on a basis of 2.10c Pittsburg. There is considerable activity in the cast iron market, some large municipal orders having been placed. There is also a fair demand for other tubular goods. There has been more inquiry for rails for 1908 shipment, but the leading interest will not take orders for that delivery.

Our statistics of blast furnace production for January show a slight decrease compared with December, but weather conditions have been very unfavorable, and floods have necessitated the banking of some stacks.

COKE PRODUCTION

Shows an Increase of Over Two Million Tons—Late Pittsburg News.

Pittsburg, Feb. 13.—The total production for the Connellsville region for 1906 as compiled by the *Connellsville Courier* was 19,999,326, as against 17,896,526 in 1905. The average price of both foundry and furnace coke considered together according to the records of the *Courier* was $2.75 per ton at the oven. The total value of the output of the region was $54,996,146 against $40,446,149 in 1905. The total number of cars shipped from the Connellsville district proper was 533,259; the tonnage was 14,399,437 tons. From the lower region 212,015 cars were sent with a total of 5,599,889 tons. At the close of the year, there were 34,059 ovens in operation, about 3,217 more than at the end of the preceding year. At the beginning of 1907, there were under construction or proposed 7,000 new ovens.

The plant of the Fisher Foundry & Machine Co. at Ford City, Pa., was completely destroyed by fire last night. The loss estimated is $200,000.

William Harrison Taylor, age 77, who died on Monday of this week at his home 329 North Craig street, Pittsburg, was the father of Harrison L. Taylor, superintendent of the Josephine Furnace & Coke Co., Josephine, Pa.

LARGE CAST IRON PIPE CONTRACT.

(Special Telegram.)

New York, Feb. 13.—It is announced that contracts for the 38,000 tons of cast iron pipe under negotiation for New Orleans have been let to R. D. Wood & Co., Philadelphia. The price is reported as $33 delivered New Orleans for 1907, and $32 for 1908. The Wood company has also booked 1,600 tons for Corning. The United States Cast Iron Pipe & Foundry Co. has taken 1,500 tons for Newark and 2,300 tons for New York. A considerably larger tonnage is under negotiation.

Structural orders during the week have been few and have included no large lots. The Erie is in the market for 2,500 tons of bridge material. Last month was the largest January in the history of the American Bridge Co.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Little Buying or Inquiring for Pig Iron—Specifications Heavy.

Office of THE IRON TRADE REVIEW.
521 PARK BUILDING, Feb. 13

The bear talk emanating from Wall street has undoubtedly had considerable influence on market conditions in the direction of influencing buyers to hold off before closing for their requirements for extended future delivery but as far as is disclosed by a careful investigation of actual conditions as they exist in this district at the present time and relate to conditions bearing on the future, unfavorable reports appear to be unfounded and the opinion prevails almost generally that they have been started for the far reaching purpose of influencing proposed legislation affecting corporate interests in various parts of the country. The money stringency in the east has also had some influence and promoters have experienced difficulty in financing extensive new operations. This condition has resulted in diverting contracts that have been under negotiation for some time past. There is nothing in the situation at the present time as far as the iron and steel business is concerned to cause uneasiness, and it would not take much of a start to make the beginning of a very general movement which would offset the present quiet condition brought about by the inclination to hold off and see what somebody else is going to do. The past week, as far as actual new business in the way of new contracts for material is concerned, was very light in all lines; the inquiry has been correspondingly light and the lull in the strenuous rush of the past seven months is not at all unwelcome. With the quiet in the direction of new buying, specifications against old contracts in all finished lines have been tremendously heavy and in most instances greater than the capacity of the mills to turn out and make shipments.

Pig Iron.—The week under review has developed nothing new or in fact anything at all, the inquiries being few and for very small tonnages, these coming only from those consumers of pig iron who have not covered or to whom shipments on contracts made some time ago have not begun. There has been a noticeable decrease on the demand for spot iron and prices for future deliveries are getting down to a more healthy basis. As far as can be seen, there is nothing wrong in the situation or anything unsettling in any degree. The tremendously fictitious prices on spot iron prevailing since the beginning of the winter have to a great extent fallen off and this has affected the later market very materially. Prompt Bessemer pig iron is now quoted at $23 valley furnace, second quarter at $22 to $22.50, third quarter $22 and last half $21.50 to $22. Northern No. 2 foundry iron is quoted $25 valley furnace for prompt delivery; $23.50 for second quarter, $22 for third quarter, $21.50 for last half delivery. Second quarter northern foundry iron is not at all plentiful. Basic pig iron is very scarce for any delivery prior to July 1. Southern No. 2 foundry iron for third quarter delivery is quoted $18.50, Birmingham. Thus far in February the southern railroads have not met the expectation of southern furnaces in moving the large accumulation of pig iron in furnace stocks held there on account of inadequate facilities to move it to the consumer. It is estimated that there are 70,000 tons of southern iron held in furnace yards and this conditon influenced railroads to withhold their advances in rates, allowing another month before they would become effective. With two weeks of that month gone, there has been practically no inroad made on this enormous stock and March 3 will probably find as much iron held in the Birmingham district as was held at the beginning of February. Buffalo & Susquehanna Furnace was blown out last Friday for repairs and will probably stay down about six weeks. The Pennsylvania Steel Co. has also blown out one of its furnaces for repairs. The Jones & Laughlin Steel Co. has completed repairs on its No. 2 Eliza stack, which was partially wrecked in explosion a month ago, and it was blown in on Monday of this week. No. 3 furnace which was down for repairs on account of a bad slip is again in operation, leaving but one furnace of the three owned by this company and out of operation on account of accidents still out of commission. On second quarter delivery we quote as follows:

Bessemer Valley	$22.00 to 22.50
Bessemer, Pittsburg	22.85 to 23.35
No. 1 Foundry, Pittsburg	24.85 to 25.10
No. 2 Foundry, Pittsburg	24.35 to 24.60
Gray Forge, Pittsburg	22.25 to 22.50
Basic, Valley	22.00 to 22.25
Basic, Pittsburg	22.85 to 23.10

Ferro-Manganese.—The price of ferro-manganese foreign 80 per cent is not as strong as it has been and we note the sale of one two carload lot at $77 delivered Pittsburg for prompt. We quote $71 to $72 Pittsburg for second quarter delivery; $68 to $70 for last half delivery at Pittsburg. The prevailing impression seems to be that ferro-manganese will reach a still lower level before the beginning of the second quarter. Ferro-silicon imported 50 per cent is quoted $110; 12 per cent, $36; 11 per cent, $35.

Steel.—Soft Bessemer billets 4 x 4 and larger are quoted $29.50, mill, Pittsburg, and we note the sale of 10,000 tons for last half delivery at $30.50, this being the first large sale for forward delivery and indicative of higher prices for semi-finished material during the latter part of the year. Any quotation for prompt semi-finished steel is nominal as none of the leading producers are in position to take on this class of business. Open-hearth billets are quoted nominally $31 to $32 Pittsburg, $30 nominal on sheet bars.

Skelp.—On account of the very heavy demand for both iron and steel skelp and the scarcity of this material in the market together with the extreme difficulty of securing muck bar for iron, skelp prices have advanced from $1 to $3 per ton and a little business where producers have a surplus over existing contracts has been done at the new figure. We quote the following nominal prices:

Bessemer, grooved, 1.80c to 1.85c; sheared, 1.75c to 1.80c; basic, grooved, 1.85c to 1.90c; sheared, 1.80c to 1.85c; iron skelp, sheared, 2.15c to 2.25c; grooved, 2c to 2.10c.

Muck Bar.—We quote nominal market on all pig metal muck bar $37 delivered Pittsburg, and part scrap bar $35. There is not a mill in the Pittsburg district in position to even make quotations on new inquiries for prompt delivery, producers either having sold up their entire surplus some time ago or increased output of finishing lines is consuming the entire supply. In any event, there is no muck bar to be had in the open market.

Plates.—But little can be said of this market aside from repeating what has been said for the past two months—that mills in this district have booked up to their full capacity for months ahead, are not taking on new business for delivery short of five months, and that specifications against contracts are enormously heavy and the supply inadequate to meet the demand. The steel car companies are, of course, the leading factors and with lake ship builders are

pressing manufacturers of plates to the limit in order to get shipments. The premium prices of eastern mills are still in effect and some business has been done with them, but not on a large scale. The following nominal official prices f. o. b. mill Pittsburg, are quoted:

Tank plate ¼-inch thick, 6¼ to 100 inches, 1.70c f. o. b. mill Pittsburg. Light plate schedule, No. 10, 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Extras on the regular plate schedule are as follows per 100 pounds: Boiler and flange steel plates 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gages under ¼-inch to and including 3-16-inch plates on thin edges, 0.10c; under 3-16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—Independent interests in position to give reasonably prompt delivery are securing from $1.50 to $2 premium without difficulty, but the leading interest has not taken on any premium business and announces that it will not do so, specifications now on the books being sufficient to offset the output and delivery dates averaging about 16 weeks. While specifications have been very heavy, the new business is only moderate. We quote:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized, Nos. 10-11, 2.65c; Nos. 12-14, 2.75c; Nos. 15-16, 2.85c; Nos. 17-21, 3.00c; Nos. 22-24, 3.15; Nos. 25-26, 3.35c; No. 27, 3.55c; No. 28, 3.75c; No. 29, 4.00; No. 30, 4.25c. Corrugated roofing, $1.85 per square for No. 28 painted, 2½ inch corrugation and $3.25 per square No. 28 galvanized, 2½ inch corrugation. Blue annealed sheets, No. 10 and heavier, 1.85c; Nos. 11-12, 1.90c; Nos. 13-14, 1.95c; Nos. 15-16, 2.05c.

Tin Plate.—Specifications so far this month have been coming in freely and from this time on until the first of April will greatly increase. Producers have large tonnages on their books and consumers, in order to get their material at the proper time, have begun to anticipate and it is expected their specifications this year will go in much earlier than usual. The leading interest has not yet announced its official third quarter price, although the independent producers are quoting an advance of ten cents over second quarter price for third quarter delivery.

Coke tin plate, 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less two per cent for cash in 10 days.

Hoops and Bands.—Specifications against old contracts are very heavy, but the new business, this being an off-time and between contract periods, has been light and will probably continue so until about April 1. We quote as follows:

Hoops, in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c base, half extras as per standard steel.

Rails and Track Material.—The tight financial situation in the east has been reflected for the past six weeks in the new rail business placed with local mills, and the past week showed a total of less than 7,000 tons standard sections in new business. The inquiry has also been light for standard sections, while in light rails the new business for the week aggregated about 3,000 tons, which was little above normal. We continue to quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $40; 12-pound, $36 to $37; 16-pound, $35 to $36; 20-pound, $34 to $35; 25 to 45-pound, $33 to $34; angle splice bars for standard sections, $1.65; spikes for forward deliveries, $2.50.

Merchant Bars.—The feature of the situation as far as merchant bars are concerned is the enormously heavy specifications against existing contracts and the tendency to anticipate requirements by specifying tonnages for each month practically through the life of the contract. There have been some sales of new business, but in comparison with the business of the previous month or six weeks, they have been small. Prices are very firm at 1.60c Pittsburg. Bar iron business in January with one of the leading producers, from a sales standpoint, was the second heaviest in the history of the country and prices are firm at 1.80c base Pittsburg for Pittsburg shipment; 1.60c base Pittsburg for western shipment from western mills. We quote as follows:

Common iron bars, 1.80c Pittsburg in carload lots and over, 1.85c in less than carloads; Bessemer steel bars, 1.60c, net; plow and cultivator, 1.60c, net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size 0.30c advance. Cold rolled and ground shafting, 50 per cent off in carload lots, and 5 per cent off in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c, sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Structural Material.—The improvement in the demand for structural material from a mill standpoint has not been enough to make any material difference and very good delivery, five to six weeks, can be secured on practically the full range of rollings. Construction companies are receiving a large number of inquiries, some of them very desirable, and are anxious to secure work for quick delivery, in order to keep their plants in full operation and tide over a dull period, which has struck them just preceding the spring rush. In order to meet this condition, very low prices on construction work are being made and competition is very strong. There is a large amount of building work in contemplation, but it has not yet reached the bidding stage. There have been no changes in mill prices and we quote as follows:

Beams and channels, 15-inch, and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.70c; angles from three to six inches inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.70c base.

Wire and Wire Nails.—No change in this situation is noted, prices being exceedingly firm and specifications very heavy amounting to more than mill capacity. The specifications by shippers and retailers in anticipation of their spring business is very heavy, as stocks are low and mill shipments inadequate to meet requirements. We quote as follows:

Wire nails, jobbers' carload lots, $2; retailers' carload lots, $2.05; less than carloads, $2.10; painted barb wire, $2.15, for jobbers in carloads; retailers in carloads $2.20; and less than carloads, $2.30, with 30c for galvanizing; plain wire, $1.85 for jobbers and $1.90 by carload.

Merchant Pipe.—The steady volume of heavy specifications which has been coming in for the past two

months and which primarily brought about the recent advance in price still continues, the tonnage being about the same on weekly averages as has been. Delivery promises are from three to four months, as has been noted, and mills have been selecting the additional business they are taking on. Jobbers' discounts are 76 base, base sizes and five; consumer's carloads base discounts are as follows:

	Steel black	Steel galv.
⅛ to ¼ inch	66	50
⅜ inch	68	54
½ inch	70	58
¾ to 6 inches	74	64
7 to 12 inches	69	54
EXTRA STRONG PLAIN ENDS.		
⅛ to ⅜ inch	59	47
½ to 4 inches	66	54
4½ to 8 inches	62	50
Double extra strong plain ends, ⅛ to 8 inches	55	44

Wrought Iron Pipe.—During the past week the Philadelphia Co., of Pittsburg, has let its annual contract for the work of the coming summer, and the Wheeling Steel & Iron Co., secured 30 miles of iron line pipe; A. M. Byers, 47 miles merchant iron pipe and South Chester Tube Co., 55 miles tubing and casing. Prices are very firm and the supply of material considerably less than the demand, with shipment dates as far as six months ahead. Jobbers' extreme discounts are 70 and five on large lots and to consumers 69 on base sizes. We quote as follows:

	Card Weight black	Card Weight galv
⅛, ¼ and ⅜ inch	61	45
½ inch	64	53
¾ to 4 inch	69	59
4½ to 6 inch	69	59
7 to 12 inch	65	50
PLUGGED AND REAMED.		
1 to 4 inch	67	57
EXTRA STRONG PLAIN ENDS.		
⅛, ¼ and ⅜ inch	54	42
½ to 4 inch	61	58
4½ to 8	77	44
DOUBLE EXTRA STRONG.		
⅜ to 4 inch	50	39

Less carloads, two points higher discount.

Boiler Tubes.—There has been no change in this market; the very heavy specifications against existing contracts continue and prices are firm as follows:

Boiler tubes.	Steel	Iron
1 to 1½ inches	47	47
1¾ to 2¼ inches	59	42
2½ inches	61	42
2¾ to 5 inches	67	54
26 to 13 inches	59	42

Less than carloads two points less.
2½ inches and smaller, over 18 feet, 10 per cent, net, extra.
¾ inches and larger, over 22 feet, 10 per cent, net extra.

Coke.—Spot furnace coke business is not as strong as it was last week, nor the demand as heavy, due partly to one large steel interest suspending shipments pending repairs on one furnace in the Buffalo district which has gone out of blast. The demand for foundry coke is a little better, foundries that had suspended shipment before the first of the year are now taking on their regular supply. For spot shipment furnace coke we quote $3.65 to $3.75, and for shipment prior to July 1, $3.40, for shipment during the remainder of the year we quote $3.10 to $3.15. Spot foundry coke is quoted $3.85 to $4.00 and for the first half $3.75 to $3.85. For shipment during the remainder of the year we quote foundry coke $3.65 to $3.75.

Old Material.—The scrap market has continued quiet and at the same time firm, much firmer as a matter of fact than was expected it would stay when prices began to scale off, and it was thought that there would be a gradual decline, but this has not been the case. Both dealers and consumers are playing a waiting game, and the business is practically at a stand-still. The few lots of scrap held by dealers and which they were compelled to dispose of, have been sold and there is no demand except for very small lots, the heavier consumers evidently holding off until they can secure heavy melting stock at about $18 delivered in the Pittsburg district. For delivery in the Pittsburg district prompt shipment, we quote as follows:

Heavy melting scrap, $18.50 to $19; re-rolling rails, $21 to $21.50; bundled sheet scrap, $16 to $16.50; iron axles, $30.50 to $31; old iron rail, $25 to $25.50; No. 1 wrought scrap, $20 to $20.50; old car wheels, $23 to $23.50; low phosphorus scrap, $22.50 to $23; machine shop turnings, $14.75 to $15.25; axle turnings, $15.75 to $16.25; cast borings, $12.50 to $12.75; No. 1 cast scrap, $20 to $20.50.

CHICAGO.

Pig Iron Market Shows Some Weakness.—Furnaces Differ in Policy.

Office of THE IRON TRADE REVIEW.
1362 MONADNOCK BLOCK, Feb. 12

Local attention is riveted on pig iron. The feeling of uncertainty noted last week has increased. Under certain conditions, quotations for the last half on northern and southern foundry grades can be shaded 50 cents a ton. This disposition is not general, however, and has not affected the prices of leading factors. Buying continues light, but in view of the market activity of January, furnace men profess not to be alarmed over this fact. Buyers, on the other hand, declare there is much significance in this change. The car situation is unimproved, and among southern sellers conditions in the Birmingham district are regarded as hopeless.

Cast iron pipe shows a seasonable activity. In addition to a large number of orders from gas companies and country municipalities aggregating a tonnage of considerable proportions, Salt Lake City has closed for 3,000 tons and New Orleans has let part of its proposed requirements. Other forms of tubular goods are also in brisk demand, though shipments are seriously delayed by the steel shortage and car scarcity. Inquiry for rails for 1908 shipment continues to be made, but the leading makers are disinclined to book orders for that delivery at this date.

Except from railroads and car companies, structural specifications are light. The local mill is again occasionally running on billets. Scrap continues its downward course. No. 1 railroad wrought is offered at $15.50 Chicago, and car wheels at $23.50.

Pig Iron.—Considerable indifference is manifested by western buyers on last half requirements. Trading for that shipment has steadily declined since the first of the month, and it is now below what might be considered a normal condition. The misgiving which this decline denotes is held to be the outcome of the discordant opinions entertained by furnace men on future conditions as expressed by their recent actions. A more complex situation than exists today has not prevailed in many years. Not a few furnaces are shading the market for the last half, yet there are many—and they are in the majority—that will not deviate a hair's breadth from the quotations that have ruled for several weeks. On the other hand, there are well known commission houses which entertain a conviction that it is wise to sell short on the market, and others just as willing to buy all the low-priced iron that it is possible to get. Dominating these under currents, is the determination of several large buyers to postpone their purchases until the market has dropped off a few points, a feeling rapidly spreading among smaller melters. Weakness undeniably has crept into the situation, but it has not yet assumed proportions to materially change prices. While southern No. 2 is nominally held at $18.50 Birmingham, for the last half, there are well founded reports that $18 will not be refused on desirable business for that delivery. Under pressure of the same kind, but only on round lots, local furnaces will also respond to the desires of melters and shade their prices 50 cents a ton, or to the basis of $23.50 Chicago for No. 2 foundry. With these exceptions, there is absolutely no change in local prices. For delivery in the first quarter, southern No. 2 is held at $23 Birmingham and gray forge at $18 Birmingham, while for the second quarter the market still rests at $22 for No. 2. Inquiry for spot iron is active, and in lots ranging downward from 1,000 tons, a brisk business has been transacted. For third quarter shipment only, the

southern product is firm at $18.50 Birmingham, and northern No. 2 at $24 Chicago. Prices on Lake Superior charcoal are very strong, being $27.50 for prompt shipment, $26.50 for the first half, and from $25.50 to $26.50, Chicago, for the last half, according to grade and tonnage desired. Malleable Bessemer was in active demand in the week under review, St. Louis sellers reporting transactions in the neighborhood of 20,000 tons. An inquiry for 25,000 tons from an Ohio pipe interest is pending. We have revised our prices, and quote as follows for the last half. Our southern prices are on the basis of a $4.10 freight rate from Birmingham:

Lake Superior charcoal	$25.50 to 26.50
Northern Foundry No. 1	24.00 to 24.50
Northern Foundry No. 2	23.50 to 24.00
Northern Foundry No. 3	23.00 to 23.50
Northern Scotch Foundry	24.00 to 24.50
Ohio Strong Softeners No. 1	23.30 to 23.80
Ohio Strong Softeners No. 2	22.80 to 23.30
Southern Foundry No. 1	22.60 to 23.10
Southern Foundry No. 2	22.10 to 22.60
Southern Foundry No. 3	21.60 to 22.10
Southern Foundry No. 4	21.10 to 21.60
Southern No. 1 Soft	22.60 to 23.10
Southern No. 2 Soft	22.10 to 22.60
Southern Gray Forge	19.60 to 21.10
Southern Mottled	19.10 to 19.60
Southern Silveries 4 per cent to 6 per cent Silicon	24.60 to 25.10
Jackson Co. Silveries, 8 to 10 per cent Silicon	29.30 to 30.30
Malleable Bessemer	23.50 to 24.00

Billets and Rods:—More or less inquiry is always before local mills, but the tightly sold condition of producers precludes the possibility of much tonnage being placed. The Carnegie Steel Co. is reported short on deliveries of billets to Pittsburg wire mills, while the Illinois Steel Co. is forced to the necessity of occasionally rolling billets on its structural mill to keep its own finishing departments supplied. Prices are very strong, but without change, as follows: Forging billets, $38 Chicago; wire rods, $37 to $38 Pittsburg.

Iron and Steel Bars:—The even tenor of the market has not been disturbed in the past week. Bar iron remains strong at the prices which have ruled for some time. There is a good demand for hard steel angles, many supplementary orders being placed. Contracting for soft steel bars is reasonably active; so also is the movement for bar iron. Specifications are the strong feature of the situation, however. These are excessively heavy and constantly tax the utmost capacity of local mills. Deliveries are slow, especially of steel bars, several weeks leeway being required on each specification. We quote for Chicago delivery, as follows: Bar iron, 1.76½c to 1.81½c (the lowest price to large buyers only).

Hard steel angles, 1.75c; soft steel bars and bands, 1.76½c, half extras; soft steel angles less than 3 x 3, 1.86½c; hoops, 2.16½c base, full extras. We quote bar iron from stock 2.25c; full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $2, half extras; soft steel hoops, 2.40c to 2.50c, full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Plates.—Mill business is limited to the tonnage producers can handle. Deliveries are slow because of the well filled order books of every maker. The Steel Corporation cannot promise anything prior to the first of July, and for shipment within that period independent makers are asking premiums ranging from $2 to $4 a ton. Jobbers report an active movement from warehouse stocks. We quote as follows:

Plates ¼ inch and thicker 6⅛ to 100 inch wide, either universal or sheared, 1.70c Pittsburg base. For extras, see Pittsburg report. Freight rate to Chicago, 16½c per 100 lbs. Jobbers' prices for shipment from local stocks are as follows: Tank steel ¼ inch and heavier up to 72 inches wide, 2.20c; 72 inches up to 96 inches wide, 2.30c; 3-10 inch up to and including 60 inches wide, 2.30c; 3-16 inch 72 inches wide, 2.55c; No. 8 up to 60 inches wide, 2.35c. Flange steel, 25c extra; heads, 25c extra.

Sheets.—Nothing of importance has transpired in sheets in the past week. Demand continues good and prices are uniformly upheld. We quote carload lots, as follows:

Black sheets Nos. 8, 9 and 10, 1.90c Pittsburg; No. 28 gage, 2.60c Pittsburg. Galvanized sheets No. 28 gage 3.75c Pittsburg. Freight to Chicago 16½c per 100 pounds. Jobbers' prices on less than carload lots from store are as follows: No. 10, 2.25c to 2.30c; No. 12, 2.30c to 2.35c; No. 14, 2.35c to 2.40c; No. 16, 2.45c to 2.50c; Nos. 18, 20, 2.70c to 2.80c; Nos. 22, 24, 2.75c to 2.85c; No. 26, 2.80c to 2.90c; No. 27, 2.85c to 2.95c; No. 28, 2.95c to 3.05c; No. 30, 3.35c. Galvanized sheets, Nos. 10 to 20, 3.40c to 3.45c; Nos. 22 and 24, 3.55c to 3.60c; No. 26, 3.75c to 380c; No. 27, 3.95c to 4c; No. 28, 4.15c to 420c; No. 30, 5.35c to 5.40c.

Structural Steel.—While contract material is taken out in fairly good volume, it is noticeable that little of it goes into consumption. Building in Chicago is unusually quiet. Many big contracts are pending, but it is problematical when they will be let. The prevailing high prices are given as the cause for most of the delay. But for railroad tonnage, the structural business in the west would be almost at a standstill. There are no changes in prices to report. We quote as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from that city to Chicago is 16½c per 100 pounds. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.05 to $2.10 per 100 pounds; angles over six inches, $2.15 per 100 pounds base, beams, three inches to 15 inches, inclusive, $2.05 to $2.10 per 100 pounds base; channels, three inches and larger, $2.05 per 100 pounds base. Less than carload lots are $2 a ton higher than foregoing price.

Rails and Track Supplies.—Further inquiries have been received from steam roads for rail requirements in 1908. The independent mills quote on these and express a willingness to accept such business when offered, but the Steel Corporation declines to quote or consider orders for that delivery at this time. No abatement is noted in the demand for light rails. Spikes and bolts are also moving freely. We quote as follows:

Bessemer rails, $28 to $30; less than 500-ton lots, $32; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $33; 25-pound, $34; 20-pound, $35; 16-pound, $36; 12-pound, $37, and lighter sections down to 8-pound, $43.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. Angle bars in large lots are quoted 1.65c to 1.75c; for smaller quantities, 2.25c to 2.75c; spikes, large lots, 2.25c; for smaller quantities, 2.50c; bolts, large lots, 2.65c to 2.75c; smaller lots, 2.85c with square nuts, and 3c with hexagon nuts.

Merchant Steel.—An advance of $3 a ton is announced in smooth finished machinery steel, bringing the quotation up to 2c Pittsburg. Beyond this there is no change in the situation. We quote as follows:

Planished or smooth finished tire steel, 1.96½c; iron finish, up to 1½ x ½ inch, 1.91½c base; iron finish, 1½ x ½ inch and larger, 1.76½c, base; channels for solid rubber tires, ¾ to 1 inch, 2.26½c, and 1⅛ inch and larger 2.16½c; smooth finished machinery steel, 2.16½c; flat sleigh shoe, 1.81½c; concave and convex sleigh shoe, 2.06½c; cutter shoe, 2.35c; toe calk steel, 2.31½c; railway spring, 1.96½c; crucible tool steel, 6½c to 8c, with higher prices asked on special grades. Shafting is very strong and an ad-

vance is expected. Quotations are without change at 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Cast Iron Pipe.—While details cannot be learned, it is stated that R. D. Wood & Co., Philadelphia, who were the lowest bidders on the New Orleans contract, has been awarded a part of that order. In the west, there is a good demand for pipe, largely from gas companies and the smaller municipalities. Small tonnages to provide for extensions and improvements are also numerous. The city of Traverse, Mich., closed with the United States Cast Iron Pipe & Foundry Co., for 600 tons. There is no change in prices, and we quote Chicago delivery, as follows: Four-inch water pipe, $38.60; 6 to 12-inch inclusive, $37.60; 16-inch and upward, $1 a ton less; gas pipe, $1 a ton higher on all sizes.

Merchant Pipe.—Specifications and new business are active. The difficulty in securing raw material or a sufficient supply of cars is delaying the delivery of orders. Prices are firm, as follows: ¾ to six inches black steel pipe, 74.35 per cent discount; galvanized, 64.35 per cent discount. From store in small lots, Chicago distributors are asking 72½ percent discount on the base sizes.

Boiler Tubes—The improvement in tubes is well maintained. Prices are firm but without change. We quote as follows:

2¾ to five inches, steel, 65.35; iron, 54.35; seamless, 50.35; 2½ inches and smaller and lengths of over 18 feet; and 2½ inches and larger, and lengths over 22 feet, 10 per cent extra. On less than carload lots from store, we quote 60 off for steel; 47½ for iron and 47½ for seamless.

Wire Products.—The snow storms in the northwest; the floods in the southwest; the general scarcity of cars and the insufficient supply of raw material have created a condition of affairs in the wire trade not at all promising. Salesmen report that jobbers' stocks are low; that consumption is heavy, and that unless a freer movement is made in the next few weeks serious shortages will exist in several important distributing centers. The steel shortage is the most serious handicap with which mills are contending, and in some cases it has resulted in enforced idleness of one or two large plants for a couple of days each week. Prices are firm, but without change. We quote jobbers' prices, Chicago delivery, as follows:

Wire nails $2.15; painted barbed wire, $2.30; galvanized barbed wire, $2.60; smooth annealed wire, $2.30; polished staples, $2.30; galvanized staples, $2.55. Carload lots to retailers, five cents higher; less than carload lots, 15 cents higher.

Coke.—Local dealers express much satisfaction over the coke situation. Deliveries are pretty well up to date and the supply for future requirements is adequate. Standard Connellsville foundry brands range from $3.75 to $4 ovens, according to the delivery required. By-product coke is higher because of the fact that the entire output of local ovens for the balance of the year is under contract.

Old Material.—The onslaughts of some dealers who are selling scrap short have further weakened the local situation. No. 1 railroad wrought has declined to $15.50 Chicago, a lot of 1,000 tons having been offered at this price. Last half deliveries are the weakest, for the reason apparently, that they offer the greater opportunity for speculation. The 6,000 tons of material offered in the lists of western railroads last week, have been absorbed; the Baltimore and Ohio list of 6,500 tons will be sold today. New buying generally is light, practically the whole of the railroad tonnage thrown on the market last week was applied against existing contracts. We have revised our prices, and quote as follows, gross tons being given in the first paragraph:

Old Steel Rails (4 feet and over)	$19.00 to 19.50
Old Steel Rails (less than 4 feet)	18.00 to 18.50
Old Car Wheels	23.50 to 24.00
Old Iron Rails	25.00 to 26.00
Relaying Rails, subject to inspection	31.00 to 32.00
Frogs, Switches and Guards	16.50 to 17.00
Heavy Melting Steel	16.00 to 16.50
Mixed Country Steel	12.50 to 13.00

We quote net tons, as follows:

No. 1 R. R. Wrought	$15.50 to 16.00
No. 2 R. R. Wrought	14.50 to 15.00
Shafting	17.00 to 17.50
Dealers Forge No. 1	12.00 to 12.50
Wrought Pipe and Flues	11.50 to 12.00
No. 1 Cast, 150 pounds and less	18.00
No. 1 Mill	10.50 to 11.00
Mixed Busheling (No. 1 & No. 2)	11.00 to 11.50
Country Sheet	9.00
No. 1 Boilers Cut	11.50 to 12.00
Boiler Punchings	15.00 to 15.00
Iron Car Axles	26.50 to 27.00
Steel Car Axles	21.50 to 22.00
Iron Axle Turnings	11.00 to 11.50
Cast Borings	8.50 to 9.00
Mixed Borings, etc	8.50 to 9.00
Machine Shop Turnings	11.00 to 11.50
Railroad Malleable	16.00 to 16.50
Agricultural Malleable	15.00 to 15.50
Stove Plate and Light Cast Scrap	14.50 to 15.00
Old Iron Splice Bars	20.00 to 21.00

CLEVELAND.

Steel Makers Firm in Delaying Buying for the Last Half.

Office of THE IRON TRADE REVIEW, Browning Building, Feb. 12.

Iron Ore.—The question as to whether the labor supply on the iron ranges next summer will be adequate will have a very important bearing on the ore situation—especially late in the season—as it is evident that unless there are more miners available than there were last year, there will be a decided shortage. Inquiries occasionally received from furnaces indicate that they will need more ore before the season is far advanced. We quote as follows: Old Range Bessemer, $5.00; Mesabi Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.00.

Pig Iron.—Steel makers have taken a very decided stand against placing any orders for pig iron until they can do so on a basis of $20 valley. They contend that they cannot make steel at a profit unless the prices can be advanced, and that this advance will not be made on account of the higher prices for finished materials which would be inevitable. Powerful influences are opposing any further advances in finished materials on the ground that it would curtail consumption and call a halt on prevailing prosperity. Valley furnaces have about 40,000 tons of Bessemer to sell for the second quarter, and have sold practically none of their output for the last half. So far, they have declined to sell for the last half when offers of $20 have been made, and whether the buyers or sellers will succeed in establishing their views will probably not be known for some time. At present things are at a standstill in steelmaking iron and quiet prevails in foundry grades. On the latter, $22 is being paid for No. 2 for the last half, but some furnaces are selling at $21.00, and an Ashland (Ky.) interest has sold some malleable as low as $20 at the furnace. In the last named case, the furnace only recently contracted for its ore requiremtns for the last half of the year, and was anxious to sell all the iron which it expected to make from this ore. This is the only known case in which so low a price has been made. The valley interests are, as a rule, firm in their views. No. 2 northern spot foundry is selling at $26 to $26.50 Cleveland. This is a nominal quotation, as there is practically no spot iron to be had. For the last half we quote, f. o. b. Cleveland, as follows:

Bessemer	$21.00 to 21.50
No. 1 Foundry	22.00 to 22.50
No. 2 Foundry	21.50 to 22.00
No. 3 Foundry	21.00 to 21.50
No. 2 Southern	21.85 to 23.35
Gray Forge	20.00 to 20.50

Finished Materials.—On account of the strong demand which has prevailed for plates, some eastern Pennsylvania mills are still selling at 2.10c Pittsburg for prompt shipment. Deliveries from the leading producers of sheets and plates have not improved. Cleveland jobbers have advanced the

price of American Bessemer and galvanized sheets $3.00 per ton, on account of having been compelled to pay premiums for prompt shipments from mills. The demand for bar iron is good at recent quotations. Cleveland mills are sold far ahead.

Old Material.—A stronger feeling characterizes the scrap market. Though further decreases are noted in several grades, there is a firmer undertone discernible, which indicates the approach of quotations to the proper level. The market is stiffer, especially in cast scrap and a rise in prices in cast material would not be surprising. Local dealers have felt the effect of the car shortage during the past ten days. Future predictions are at variance. Some dealers are inclined to look for better prices, while others are equally confident that the bottom has not yet been reached. Weather conditions are likely to determine to a considerable extent the future swing of quotations.

We have revised our quotations, and quote, Cleveland delivery gross tons, as follows:

Old iron rails	$25.00 to 26.00
Old steel rails (over 6 feet)	18.50 to 19.50
Old steel rails (under 6 feet)	17.50 to 18.50
Old car wheels	21.00 to 21.50
Steel boiler plate	14.00 to 15.00
Steel axles	21.50 to 22.50
Malleable iron (railroad)	18.50 to 19.00
Malleable iron (agricultural)	15.50 to 16.00
Heavy steel	16.25 to 17.50
Country mixed steel	14.50 to 15.50
Low phosphorus	23.00 to 24.00

We quote net tons as follows:

No. 1 R. R. wrought	$17.00 to 18.00
No. 1 busheling	14.50 to 15.00
No. 1 machine cast	18.00 to 18.50
Iron axles	25.50 to 26.00
Axle turnings	13.50 to 14.00
Wrought turnings (free from cast)	12.00 to 12.50
Grate bars	14.00 to 15.00
Pipes and flues	13.50 to 14.00
Tank iron	12.00 to 13.00
Hoop and band iron	8.50 to 9.00
Sheet iron	8.00 to 9.00
Wrought drillings	12.00 to 12.50
Stove plate	14.00 to 15.00
Cast borings	9.00 to 9.50

CINCINNATI.

Freight Situation Does Not Improve. —Buyers are Hesitating.

February 12.

Pig Iron.—The market the past week has been quiet. There has been a moderate inquiry and buyers are showing a tendency to defer taking on iron for the last half of the year. The question of prices for the last half is the factor of most interest. The fact that present prices are higher than a normal level and show liberal profits to the producer, is practically the only argument that seems to be advanced as a reason for declining to buy at this time. Furnace order books are undoubtedly in good shape and there is enough iron sold at strong prices covering a period of time into the future sufficient to justify firm holding. Deliveries on contracts have not improved and February shipments in many instances are reported as smaller than for some time previously. It was thought that the southern railroads intended to make some unusual effort to move iron this month in order to make their advance in freight rates less objectionable, but the facts seem to be that they are furnishing fewer cars now than in January. In addition to this, the delays after the cars are started are most annoying. The Addyston plant of the United States Cast Iron Pipe & Foundry Co. was compelled to close down last Saturday for lack of iron with 100 cars of iron in transit to its plant. This situation has affected the spot market by making spot iron prices and sales apply only to iron on track in Cincinnati and ready for delivery. There have been reports of some speculative spot iron being offered at prices below current schedules, but iron that is quickly available is a ready sale at quotations. We quote spot iron delivered at Cincinnati as follows, as a basis for settling contracts based on our quotations:

Southern foundry No. 1	$26.50 to 27.50
Southern foundry No. 2	26.00 to 27.00
Southern foundry No. 3	25.00 to 25.50
Southern foundry No. 4	24.00 to 24.50
Southern fdry, No. 1 soft	26.50 to 27.50
Southern fdry, No. 2 soft	26.00 to 27.00
Gray forge	22.50 to 23.00
Northern foundry No. 1	26.65 to 27.75
Northern foundry No. 2	26.15 to 27.15
Northern foundry No. 3	25.65 to 26.65
Jackson County silvery, 8 per cent	31.15

Spot northern iron is quoted at $25.00 at furnace in the Ironton district, and $23.00 Birmingham for southern brands. Second quarter delivery southern iron is quoted at $21.00 to $22.00 Birmingham, with a difference of one dollar per ton between the grades under No. 2 foundry. Northern iron for second quarter is nominal at $22.00 to $23.00 at furnace.

For last half delivery northern iron is quoted at $21.00 to $22.00 at furnace in southern Ohio. Southern iron is quoted mainly at $18.50 Birmingham, with an occasional quotation for last quarter at $18.00, but $18.50 Birmingham is the recognized market for the entire period. The only inquiry of importance in the market this week comes from a melter in central Ohio, who is figuring on 3,000 or 4,000 tons of southern iron, for the last half. We quote last half delivery, delivered Cincinnati, as follows:

Southern Foundry No. 1	$22.00 to 22.50
Southern Foundry No. 2	21.50 to 22.00
Southern Foundry No. 3	21.00 to 21.50
Southern Foundry No. 4	20.50 to 21.00
Southern Foundry No. 1, soft	22.00 to 22.50
Southern Foundry No. 2, soft	21.50 to 22.00
Gray Forge	20.00 to 20.50
Northern Foundry No. 1	22.65 to 23.15
Northern Foundry No. 2	22.15 to 22.65
Northern Foundry No. 3	21.65 to 22.15
Jackson County Silvery, 8 per cent	30.15 to 31.15

Finished Material.—There has been no important change in the market, and retail prices here for filling orders are as follows:

Angles 3 x 3 and over, 2.15c to 2.25c; beams and channels 15 inches and under 2.15c; small angles and architectural channels, 2.10c base; plates ¼ inch and heavier, 2c; 3-16-inch, 2.10c; No. 8, 2.10c; sheets (blue annealed) No. 10, 2.15c; No. 12, 2.20c; No. 14, 2.25c; No. 16, 2.35c; box annealed sheets, Nos. 18 and 20, 2.50c; Nos. 22 and 24, 2.60c; Nos. 25 and 26, 2.65c; No. 27, 2.70c, and No. 28, 2.80c. Iron and steel bars 1.95c base; boiler tubes, 6 per cent off base; turn buckles, 45 per cent off; rivets, 3.15c base; cold rolled shafting 45 per cent off list; steel tire, 2.10c base.

Coke.—The market rules quiet. Spot offerings are light. Deliveries on contracts are slow. Prices are without material change. There is but little being done on future contracts. Prices in the leading coke producing districts are as follows:

Wise County, Va. Furnace Coke prompt shipment	$3.25 to 3.50 per ton
Wise County, Va. Foundry Coke	4.00 to 4.50 per ton
Pocahontas Furnace Coke prompt shipment	3.25 to 3.50 per ton
Pocahontas Foundry Coke	3.50 to 4.00 per ton
Connellsville Furnace Coke prompt shipment	3.25 to 3.50 per ton
Connellsville Foundry Coke	4.15 to 4.50 per ton
New River Foundry Coke on contracts	3.50 to 4.00 per ton
New River Furnace Coke, prompt shipment	2.75 to 3.00 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.70 to $1.75 per ton on $9.00 pig iron, plus 19 to 20 per cent of the advance on pig iron above $9.00 Birmingham.

Old Material.—The market has ruled quiet and easy. The demand is fair for some descriptions, but others are dull. We quote delivered at Cincinnati, as follows:

Old No. 1 railroad wrought, net tons	$17.00 to 18.00
Cast machine and foundry, net tons	17.50 to 18.00
Old iron rails, gross tons	24.00 to 25.00
Old steel rails, gross tons	18.50 to 19.00
Old short lengths, gross tons	17.00 to 18.00
Old iron axles, net tons	25.00 to 25.50
Heavy melting scrap, gross ton	20.00 to 21.00
Stove plate, net tons	14.00 to 14.50
Wrought turnings, net tons	12.00 to 12.50
Cast borings, net tons	8.50 to 9.00
Car wheels, gross tons	20.50 to 21.00

PHILADELPHIA.

Cold Weather Adds to Embarrassment of Railroads—Foreign Iron Firm.

February 12.

Pig Iron.—If the market really needed any bracing, regarding which point there is a diversity of opinion, it came in the touch of winter which is still felt throughout northern territory. The snow, while not seriously impeding transportation, has helped to accentuate the scarcity of cars, which is proving embarrassing to many furnaces, restricting their deliveries and thus more than ever curtailing the supplies of consumers. In a number of instances small establishments have had to shut down temporarily for lack of the necessary carload or two of pig iron, and large plants have been re-

duced to a very uncomfortable margin of safety, in some cases not having more than two days' supply of iron on hand. Under such circumstances, and with the prospects of the cost of production being increased in the near future, furnace men can see no reason why they should reduce prices. The appeals for iron that come to them from New England are especially insistent, as the railroads there have proved quite inadequate to the traffic offered them and deliveries are much delayed. Some large concerns have still failed to cover their requirements for the second quarter, and there is now every indication that when they do come in they will in all probability have to pay the very stiff prices now ruling for spot iron—$26.50 to $27.50 for No. 2 X foundry and $25.00 to $25.50 for basic. Notwithstanding the reports from abroad of a considerable drop in the price of English iron, the cargoes now arriving or on the way, nearly all of which have been sold, are held very firm. For Scotch iron at dock $25.50 to $26 is asked, for Middlesborough No. 1 $23, and for No. 3 $22.50. Buying for the last half continues fairly active, with no change from the prices quoted last last week for that period, as follows:

No. 1X Foundry	$26.50 to 27.00
No. 2X Foundry	23.75 to 24.75
No. 2 Plain	23.25 to 23.75
Standard Gray Forge	22.50 to 23.00
Basic	23.50 to 24.00
Low Phosphorus	27.00 to 27.50

New Material.—Orders continue to pour into the mills in satisfactory volume. The demand for plates, structural steel and bar iron being especially good. The situation may be considered excellent in every respect, from the standpoint of the producer, and prices show no change, as follows: Beams, channels and angles according to specifications, 1.83½c to 2c; refined iron bars, 1.89½c to 1.93½c; steel bars, 1.83½c to 1.88½c; plates, 2.13½c to 2.18½c.

Old Material.—The most striking feature of the scrap market is that low-priced materials, such as cast borings and wrought turnings, are strong, with an advancing tendency, while the higher grades are quiet or even weak. The snow has put a temporary embargo upon collections, and the situation shows little changes, prices being quoted about as follows:

Old steel rails	$19.50 to 20.00
No. 1 steel scrap	18.00 to 18.50
Old steel axles	22.00 to 22.50
Old iron axles	30.00 to 31.00
Old iron rails	26.50 to 27.00
Old car wheels	23.00 to 24.00
Choice scrap, R. R. No. 1 wrought	21.25 to 21.75
No. 1 yard scrap	19.00 to 19.50
Machinery scrap	22.00 to 22.50
Low phosphorus scrap	22.50 to 23.00
Wrought iron pipe	16.00 to 16.50
No. 1 forge fire scrap	16.25 to 16.75
No. 2 forge fire scrap, ordinary	11.50 to 12.00
Wrought turnings	16.50 to 17.00
Axle turnings, heavy	17.00 to 17.50
Cast borings	14.00 to 14.50
Stove Plates	16.75 to 17.25

NEW YORK.

Increase of Inquiry for Pig Iron.—Sales of Fair Size.

Office of THE IRON TRADE REVIEW.
ROOM 1315, No. 150 NASSAU ST., Feb. 12

Pig Iron.—Inactivity in the local pig iron market following the recent circulation of bearish reports has largely given way and there is a noticeable increase in inquiry. Several sales of fair volume are reported and the aggregate of tonnage now under negotiation is considerable. Melters are seeking iron for various deliveries. In spot and early shipment iron, several contracts calling for small lots have been closed during the week at practically the same level which prevailed for some time, while a part of the larger lots recently sold are for early delivery. Current inquiry still occasionally bears the ear-marks of "market sounders," put out with the idea of testing reports of weaker conditions, but producers willing to grant concessions are few and far between, southern and western furnaces being particularly firm. It is understood that the General Electric Co. has closed direct with a certain furnace interest for an aggregate of 4,000 tons mostly low silicon analysis iron, though containing some little iron high in silicon: a part of this purchase is for prompt delivery, the remainder running through the spring and summer. The McCrum-Howell Co. has closed for 2,000 tons, second quarter delivery, and the International Steam Pump Co. has taken 1,000 tons of Virginia iron for its Harrison works. Bessemer and basic are quiet in this district, though occasional lots are being placed at unchanged prices. We quote tidewater prices as follows:

Northern Foundry No. 1	$24.00 to 25.00
No. 2 Foundry	23.50 to 24.50
No. 2 Plain	23.00 to 24.00
No. 1 Southern Foundry	22.50 to 23.00
No. 2 Southern Foundry	22.00 to 23.00
No. 3 Southern Foundry	21.50 to 22.00
No. 4 Southern Foundry	21.00 to 22.00

Finished Material.—Railways are the chief contributors to current business in finished lines, and as their purchases are largely confined to emergency work, the aggregate tonnage is not extensive. None of the several structural orders pending in this city has been closed and the relatively small tonnage involved is receiving unusual attention. In plates the demand is light and premiums on quick delivery business are not so large as formerly. Bar iron in the last continues its usual activity and the local market is brisk, one lot of 1,000 tons being among the week's sales.

The following are prices at tidewater: Angles 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.94½c; flange, 1.94½c; marine boiler, 2.14½c; refined iron bars, 1.84½c to 1.89½c; soft steel bars, 1.74½c to 1.84½c; sheets, No. 28 black, 2.60c.

Old Material.—The local market has been one of inactivity during the week, pending the award of heavy tonnages by a number of eastern railway lines. In many instances mills competed actively with dealers for desirable lines, though the few results announced indicate that the scrap went at relatively low prices. Heavy steel and cast scrap are among the strongest lines on the market. Current sales include 1,000 tons of low phosphorus. We quote tidewater prices as follows:

Old iron rails	$24.00 to 25.00
Old steel rails, long lengths	20.00 to 21.00
Old steel rails, short pieces	18.50 to 19.00
Relaying rails	28.00 to 29.00
Old car wheels	22.00 to 22.50
Old iron car axles	28.50 to 29.50
Old steel car axles	21.00 to 21.50
Heavy melting steel scrap	17.50 to 18.00
No. 1 railroad wrought scrap	20.50 to 21.00
Iron track scrap	18.00 to 18.50
Wrought pipe	15.00 to 15.50
Cast borings	11.50 to 12.00
Wrought turnings	15.00 to 15.50
Heavy Cast Scrap	18.50 to 19.00

BUFFALO.

Very Little Iron Being Sold.—Car Shortage.—Furnace Blows Out.

February 12.

Pig Iron.—No change in prices has occured within the week just closed. Selling continues light, all business being for last half delivery with no prompt iron offered. Inquiries are numerous and the demand for all pig is somewhat stronger than that of the preceding week. The demand for spot is stronger than ever before. Sales were made for last half at prices ranging from $23 to $23.40 Buffalo, including freight. Southern iron has also been offered and sold here the past week for prompt delivery, the price quoted being $24 at Birmingham. The freight to Buffalo from those furnaces is $4.65, but will be $4.90 afterwards.

A good deal of difficulty is reported in securing cars for prompt shipments and in some instances delays of a week in getting certain shipments out have occurred. The railroads have been asked to use all expedition and try to remedy matters, but with other matters hampering them it appears that the railroads are not in a position to offer immediate relief.

The local pig iron output has been cut down by 350 tons a day on ac-

count of the blowing out of one of the big furnaces of the Buffalo & Susquehanna Iron Co. The company decided to reline the furnace, but it is expected that it will be again in operation in a month or six weeks. As in other localities, during these times when pig iron is demanded everywhere by consumers, the Buffalo furnaces have been running at the limit capacity and are likely to continue doing so for a long period. Much interest is shown locally in the financial conditions of the country, especially in the case of the railroads, reported in certain instances, to have prepared for a curtailment of expenses. It is felt here that the tone of the iron market will continue strong. We quote for last half delivery as follows:

No. 1 X Foundry	$22.75 to 23.25
No. 2 X Foundry	22.25 to 22.75
No. 3 Foundry	21.50 to 22.00
No. 2 Plain	22.00 to 22.50
Malleable Bessemer	22.50 to 23.00
Gray Forge	21.50 to 22.00
Charcoal	26.00 to 27.00

ST LOUIS.

Inquiries Decline, Sales are Few and Some Concessions are Made.

February 11.

Pig Iron.—A feeling of hesitancy today pervades the iron market and consumers who a few days ago were preparing to embark months into the future are holding back and awaiting developments. Inquiries have slumped off considerably and sales for extended periods are few, though business for immediate consumption continues in about the same volume with prices well maintained.

It is to the future that attention is being paid today almost exclusively and furnace men and buyers are alike interested. A decline of 50 cents a ton for southern foundry iron for last half was noted in the last week. While $18.50 has been the prevailing price for No. 2 Birmingham $18.00 is freely quoted today on desirable business. There is a report of a transaction at $17.75 for No. 2, but this could not be verified. Iron for small orders and for third quarter is still quoted at $18.50. Sloss continues to hold firm at $19, but few sales are made at this figure. President Maben says this figure represents the market and his company will not go lower. He is of the opinion that the railroads cannot handle the accumulation in southern yards fast enough to effect the market and that, as soon as the present flurry is over, iron will be thoroughly established on the $19 basis.

Whatever the cause, the flurry has had the effect of checking buyers. Old pig iron men argue that it is simply a natural result from a long sustained rise and does not indicate that there will not be abundant demand for all the iron produced. As long as prices were advancing week after week, buyers would be scared into the market for fear of being caught, but when the market stood still for awhile, they began to get dubious. It does not appear that there will be any violent break, but simply that iron for summer delivery will not sell at premium prices brought on by a series of unusual conditions.

A leading car interest which has been in the market since the middle of January has apparently retired from the market after making a few slight purchases. An East St. Louis works bought 1,000 tons for last half on the basis of $18.00 Birmingham and one of the leading malleable concerns took 3,000 tons of malleable. There was a fair volume of spot iron sold at $23.00 for No. 2 Birmingham. Second quarter is seldom quoted, but the figure is $21 to $22.

Iron quotations for the first quarter, including the new freight rate of $3.75 (which will go into effect March 3) range as follows:

Southern No. 1	$26.75 to 27.25
Southern No. 2	26.25 to 26.75
Southern No. 3	25.25 to 26.25
Southern No. 4	24.25 to 25.25
Gray Forge	23.75 to 24.25

Coke—Coke is scarce and hard to get. It is being sold from $4 to $4.50 depending upon delivery.

BIRMINGHAM, ALA.

Railroads Not Able to Improve Delivery of Pig Iron.

February 11.

A number of furnace companies in the southern territory, including Alabama and Tennessee, announce that the probable make of iron during the third quarter of the year has been well covered already. No. 2 foundry iron, for delivery during the first nine months of the year, can hardly be secured and $19 per ton is being asked for iron for any time this year. The deliveries being made now are far from giving entire satisfaction to the manufacturers. The railroad facilities are not as much improved this month as it was anticipated they would be. The total movement of pig iron from this section of the country for the month, prior to the time at least that the advance in freight rates goes into effect, will not be any more extensive than during January. The car shortage is still to be commented on. As far as can be learned, there will be no further delay in putting the advance of 25 cents on the ton from the southern territory to the Ohio river into effect on March 3. The suggestion was made that an object for the proposed advance in freight rates was to establish a maximum in case of legislation by the state law makers. This idea was resented, and instead the claim is made that the object was to enjoy some of the general prosperity prevailing throughout the country, especially in the iron industry. On top of this it is noted that the law makers in session at Montgomery, Ala., have prepared a bill which fixes rates which were in effect Jan. 1 as the maximum rates.

The record among furnaces for the month as far as production goes is that one furnace of the Sloss-Sheffield Steel & Iron Co., has blown out and one of the charcoal furnaces of the Shelby Iron Co., has been put in operation. The Sloss-Sheffield company will make extensive repairs on its furnaces, adding a skip hoist and other modern appurtenances. There is a good demand for charcoal iron and the best prices ever prevailing for that commodity are now in effect.

Metal Market

NEW YORK.

February 12.

Copper.—Railway and other difficulties in the producing districts continue an aggregating feature of the market, and the largest interests are declining quotations until the situation clears. As a result, little spot business is being done, and there is only limited selling for April, May and June, electrolytic for these shipments being quoted at about 25c. Lake brands for future delivery are held at 25c to 25¼c, with casting copper at 24¼c to 24¾c. Electrolytic in London for future delivery ranges from £116 to £117. February exports have been considerable.

Pig Tin.—Considerable competition for local business late in the week brought about a slight decline, this being a reflection of the foreign market. Spot tin, however, is firmer at 42¼c to 42⅜c. It is reported that slightly more than 3,000 tons of the metal is afloat, though arrivals so far this month have been extremely small. London spot closed the week at £191 for spot and £190 7s 6d for futures.

Pig Lead.—The demand is only moderate, though the market is firm on the following prices: spot (carload lots) 6.30c; jobbing lots same, 6.35c; soft Missouri, spot, 6.10c; special brands, 6.12½c to 6.15c.

Spelter.—Imports have been considerable, but the market has taken this well. Refined is quoted at 6.80c spot,

St. Louis at 6.70 to 6.75c, and London at £26.

Antimony—Cookson's is quoted at 25c to 25½c, Hallett's at 24c to 24½c, and ordinary brands are held at 23¼c to 23¾c.

CHICAGO.

February 12.

Little change is apparent in the metal market. Pig tin advanced under increased demand from 44¾c to 45c, and spelter followed changing from 7c to 7⅛c. The volume of business continued constant. The increased demand for copper noticed last week continued, but did not change the price of 26¾c for casting and 27c for lake. Lead remained unchanged, desilverized at 6.50c to 6.60c for 50-ton lots, and corroding at 7.25c to 7.35c. Carload lots are 2¼c per one hundred pounds higher. Sheet zinc is steady at 8.40c La Salle in car lots of 600-pound casks. Antimony remained at 28½c for Cookson's, and 26½c for other grades.

The demand for old metals is light and prices are sagging. We quote dealers' buying prices as follows: Copper wire, 20¾c; heavy copper, 20¼c; copper bottoms, 19½c; copper clips, 19¾c; red brass, 19½c; red brass borings, 16¼c; yellow brass, 16c; yellow brass borings, 14¼c; light brass, 12¾c; lead pipe, 5.50c; tea lead, 5c; zinc, 5c; pewter No. 1, 28c; tin foil, 34c; block tin pipe, 27¾c.

ST LOUIS.

February 12.

Spelter is strong on a basis of $6.80, at which figure several carloads were sold last week.

Lead is steady and firm, but the movement is light on a basis of $6.10 for Missouri with non-corroding brands higher.

All the ore in the bins has been sold in the Missouri-Kansas field and the stock is lower than it has been for months. On account of winter weather the output for the week was small and there may be a shortage soon.

Among recent dividend declarations were the following: American Seeding Machine Co., regular quarterly dividend of 1 per cent, payable April 16; American Radiator Co., 1¾ per cent regular quarterly dividend on the preferred stock, payable Feb. 15, the regular quarterly dividend of 1 per cent and an extra dividend on the common stock, payable March 30; Niles-Bement-Pond Co., regular quarterly dividend of 1½ per cent on preferred stock, payable Feb. 15, and a regular semi-annual dividend of 3 per cent on common stock, payable in two equal instalments.

PHILADELPHIA FOUNDRYMEN'S ASSOCIATION.

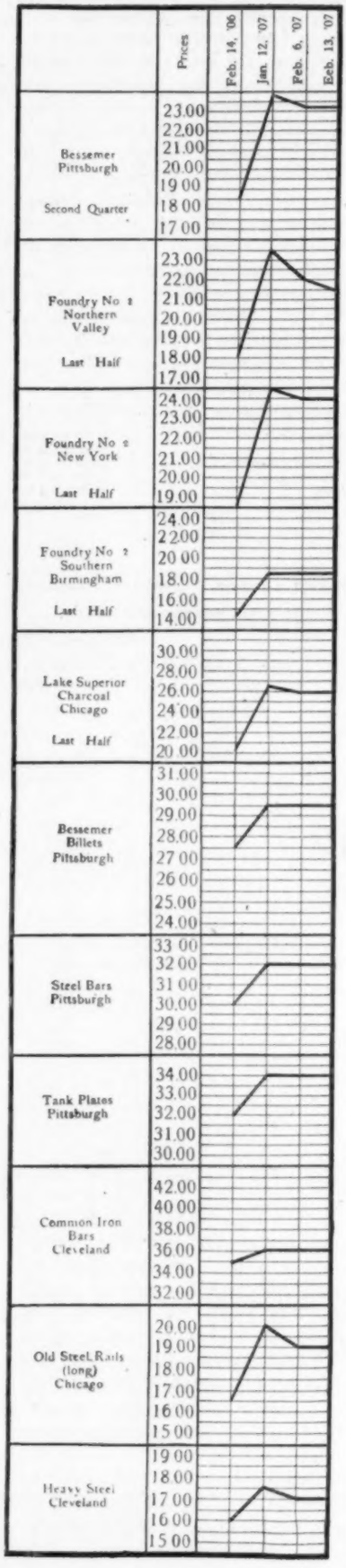
At the monthly meeting of the Philadelphia Foundrymen's Association, which was held at the Manufacturers' Club on the evening of Feb. 6, a communication was read from the New England Foundrymen's Association enclosing a protest to the Interstate Commerce Commission against the recent proposed advance by the railroads of 25 cents a ton on southern pig iron after Feb. 1, and inviting the co-operation of the Philadelphians in the movement. After some discussion, although the date for putting the advance has been postponed, it was agreed to join in the protest.

The committee appointed to arrange for the entertainment of the national convention of the American Foundrymen's Association reported that no meeting had been held in the past month, but that some points had been agreed upon subject to change. It was said that some 1,000 to 1,200 persons were expected to attend, for whose entertainment $8,000 to $10,000 would be needed. All foundrymen are invited to attend the convention, but those not identified with any association will be expected to contribute toward paying for the entertainments to be provided.

W. A. Pollock Davis was to have read a paper on "The Introduction of Nickel and Molybdenum Alloy in Foundry Practice," but sent word that he was detained in Baltimore. In his absence Vice President A. E. Outerbridge, who occupied the chair in the absence of President Devlin, gave a little talk on his experiences in the use of alloys in making castings.

Controlling Interest Sold.—Elisha H. Miller, for many years president of the Phoenix Horseshoe Co., Joliet, Ill., has disposed of his controlling interests in the company and retired from all connection with the firm. The purchasers of his stock were J. W. Kiser, a director in the company for the past five years, through whom the deal was negotiated, Elbert H. Gary, chairman of the executive committee of the United States Steel Corporation; James B. Forgan, president First National Bank, Chicago; Darius Miller, president C. B. & Q. R. R., and William V. Kelly, president of the American Steel Foundries. Mr. Kiser was elected president to succeed Mr. Miller. No other changes in the corporate or executive management are contemplated at this time.

PRICE CHART.



MACHINERY DISTRICT

In Chicago Affected by Condemnation Proceedings.—Trade News.

Chicago, Feb. 12.—The notice of the filing of condemnation suits against the owners of the property which the Chicago and Northwestern railroad will use for depot purposes was given this week. The property between Canal and Clinton streets, Fulton and Madison streets, which will be covered by the new structure is in the heart of the machinery district and three-fourths of the firms located there will be compelled to move.

Many firms have already purchased new sites or secured leases on other quarters and over half the firms affected will move May 1. Those who have announced their intentions seem to be moving to Jefferson and Desplaines streets within two blocks of their present locations. There is no ground for the fear at first expressed that the machinery center would be scattered. Firms who have not yet made arrangements for new salesrooms are making efforts to locate before the end of February. Some which have secured options on sites are reticent about their plans and will not disclose their new addresses until the arrangements are final.

The stores on the west side of Clinton street and the east side of Canal street are not affected by the Northwestern depot plans and will remain where they are.

The rumored project of the Chicago, Milwaukee and St. Paul railroad building a depot east of Canal street adjoining the Northwestern depot is furnishing some uneasiness to the firms in the affected district. Since the plan was first mentioned nearly two months ago, no further information has been given out by directors of the road. Although no necessity exists according to the opinions of architects for the Northwestern to begin work in the block south of Randolph street for a year, the wreckers will begin this spring to tear down the buildings already purchased by the road. The work will have the effect of making the neighborhood uncomfortable for the firms which remain. The streets will be blockaded with building material and wagons and the air will be filled with noise and brick dust. The policy of the road accounts a great deal for the anxiety of some of the firms to move at once.

No let up in the demand in the machinery market is apparent. Chicago representatives who have returned from the east express the belief that the plants are not catching up with the orders, but are dropping a little further behind. In the general lines such as drills, planers, lathes, cranes, etc., the demand seems to be for single pieces rather than for general shop equipment. The buying is for the enlargement of plants already existing rather than for the establishment of new shops. Several firms report orders, however, for complete plants.

The automobile show at the Coliseum has brought many purchasers to the city during the week. Many of them spent their afternoons in the west side machinery districts and their evenings at the Coliseum.

All the large machinery houses have been figuring during the past week on the specifications of the new car plant of the Pullman company at Pullman, Ill. The specifications are extensive, covering more than 20 closely typewritten pages and the time of the estimators has been entirely taken up with the contract.

No larger lists of needed tools have been given out by any railroad since the list of the Baltimore & Ohio railroad last week. Several smaller lists have appeared.

The market in second-hand machinery is strong, caused by the inability of many would-be purchasers to get new machinery for immediate delivery. Many firms which have never handled second-hand goods are buying shop equipment. A representative of one Chicago firm purchased 100 tons of second-hand shop machinery on a visit to Philadelphia last week.

"I want something in my store," he explained, "beside a stenographer and a cash register. I don't think any store is complete without something to sell and my regular lines are all sold out."

All the firms express willingness to take back any of their own machines which have been used.

In wood-working machinery the demand is brisk and the dealers are swamped. The supply is sold six and eight weeks ahead. Complaint is made that many factories are finding it next to impossible to get castings.

In all lines collections are reported easier and many firms say that they have no complaint to make. The Scully Steel & Iron Co. announces that collections in 1906 have been better than any previous year. The percentage of losses through failures is smaller than ever before in the history of the firm.

LARGE INCREASE

Shown by the Chicago Pneumatic Tool Co.'s Earnings.

The Chicago Pneumatic Tool Co., in its annual report, shows that it has increased its net earnings $150,000, or 18 per cent, over 1905 and after liberal depreciation charges, including $100,000 for the new plant in England, the balance to the stock is at the rate of nine per cent, comparing with 8½ the previous year and 2½ two years ago. The statement of the company for the last four years shows the following:

	1906.	1905.	1904.	1903.
Net profits	$1,001,550	$852,612	$470,580	$701,464
Depreciation	250,082	160,800	165,255	174,484
Balance	751,468	691,812	305,325	526,980
Bond interest	115,000	115,000	115,000	115,000
Sinking fund	50,000	50,000	50,000	50,000
Balance	586,468	526,812	140,325	361,980
Dividends	244,351	244,551	.....	361,980
Surplus	342,117	282,261	140,325	.....
Previous surplus	536,292	254,031	113,707	113,707
Total surplus	878,409	536,292	254,032	113,707

President J. W. Duntley of the company supplements the report by the following:

As stated in previous reports, this company acquired the Consolidated Pneumatic Tool Co., Ltd., London, and since that time it has organized the International & Pressluft & Elektricitats-Gesselschaft, Berlin, and has purchased the Canadian Pneumatic Tool Co., Ltd., Montreal. All of these organizations show during the year increased volume of business and substantial gains in assets, with the result that this company has benefited in additional facilities for marketing its output, with resulting increased profits.

In connection with the acquirement of the business of the Philadelphia Tool Co. and the organization and extension of the foreign companies mentioned above, it was thought desirable to borrow temporarily the sum of $195,000, which amount is included in the bills payable, amounting to $247,500.

The excess current assets Dec. 31, 1906, $1,542,075.99, shows an increase of over $883,000 since your company was organized.

The following directors were reelected: Charles W. Amory, Adolphus C. Bartlett, Enos M. Barton, Alexander Cochrane, W. Murray Crane, Frederick P. Fish, Henry S. Howe, William R. Patterson, Thomas Sherwin, Harry B. Thayer, Arthur D. Wheeler and Charles Williams Jr.

The Pressed Steel Car Co. has received an order from the Chesapeake & Ohio railroad for 4,000 steel cars.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

PUBLISHED EVERY THURSDAY BY
THE PENTON PUBLISHING CO.
CLEVELAND

BOSTON
CHICAGO
CINCINNATI
DULUTH
NEW YORK
PHILADELPHIA
PITTSBURG
BIRMINGHAM, ENG.

Subscription, $3.00 per annum. To Foreign Countries, $4.50. Advertising Rates Furnished on Application.

Change of advertising copy must reach this office ten days preceding date of publication.

The Cleveland News Co., will supply THE IRON TRADE REVIEW through the regular channels of the American News Co.

European Agents: The International News Company, Breams Building, Chancery Lane, London, E. C., England.

ENTERED AT THE POST OFFICE AT CLEVELAND, AS SECOND CLASS MATTER.

PRINTED IN AN OPEN SHOP

February 14, 1907.

THE RAILROAD SITUATION.

We of the new world have always been disposed to cavil at the homage paid to a name, through succeeding generations, in the older countries. We pay our homage to men, and change the men at frequent intervals. We are the more ready to bestow, because we know how easy it is to withdraw. Just at the present time homage is being given in unstinted measure to Mr. James J. Hill. He is one of the greatest railroad builders this country of great railroads has ever seen, but every situation has its limitations.

Wall street's homage won largely by means of the much exaggerated ore land deal, has gone to the extreme length of taking Mr. Hill in perfect seriousness in connection with his recent pronunciamento on the freight situation. Mr. Hill, it will readily be recalled, stated on Jan. 14 in a letter to Governor Johnson, of Minnesota, that traffic had grown much more rapidly than railroad mileage, and that adequate handling of the present freight tonnage called for the building of 75,000 miles of railroad, costing $5,500,000,000, during the next five years. This thought Mr. Hill presented in a setting of such curious device that it suits the taste or position of the observer, whatever that taste or position may be. To the people of the northwest, freezing by reason of the fuel famine, the frame is black. To them the argument appears to be a *reductio ad absurdum*, in that neither the men nor the money can be found to build these 75,000 miles in five years. To the advocates of water transportation the mention of a 15-foot canal or channel from St. Louis to New Orleans, as a happy measure of relief, puts a silver frame around Mr. Hill's picture.

But to Wall street the frame is one of pure and glittering gold. Wall street has already begun to count up the profits to the iron trade of $1,100,000 000 being spent in each of the next five years on railroad building, with the natural flow of the larger part of this interesting sum into iron trade channels. Thus it goes. Age and aptitude have made rather familiar the adage about the gods first making mad those whom they would destroy. The practice of the American people, in lavishly bestowing and lightly withdrawing their homage, suggests an antecedent state to that of madness, a state of popularity.

If Mr. Hill is right in his demand for 75,000 miles of railroad, and granting certain premises, no one can venture to deny that he is right, then the case of the railroads is an utterly hopeless one. Neither the men nor the money can be found. The railroads have well-nigh exhausted their borrowing power. Mr. Hill's figures are that in the past 10 years they have built but 37,500 miles of railroad, and in the last of the ten new railroad building is the smallest in years. For months orders for tens of thousands of freight cars have been hung up because the railroads cannot finance car trusts except at a rate which would be ruinously high to the railroads. It is useless to pursue this line, so obvious is it that the case is a hopeless one if this additional mileage is necessary.

It is possible, however, that Mr. Hill's premises are wrong. It is not so long ago but that even in this busy age the incident is remembered, that Mr. Hill gave testimony in connection with the improvement of the Erie canal, that he could build a railroad on scientific principles which would put out of business any artificial waterway having a depth of less than 20 feet. In the letter to Governor Johnson last month he suggests the building of a canal 15 feet deep. Here is a discrepancy, and for any explanation of it, or any attempt at explanation, the columns of THE IRON TRADE REVIEW are freely opened. If in either one of these two pronouncements Mr. Hill was wrong, it is possible he is wrong in others also.

Relief to the throttled traffic of the country may come from some new quarter. Figures have been presented which show that the average elapsed time of freight shipments has increased in the past few years, and all shippers know that since these figures were compiled the situation has grown still worse. At the same time the running time of passenger trains has been increased. There is no sign of a trend in the right direction. Where freight is delayed, cars are usually delayed with it. Where cars are delayed, tracks are occupied. To the layman the problem is so clear the sun shines through it, but there is no calling so tightly closed to the layman as that of the railroader, who rises, if at all, by the slowest steps. Other lines have drawn brains from wherever they could be had, but the railroad must discover them, if at all, in its own ranks.

Railroading has developed, in its own chosen and narrow paths, until it has met the stone wall of an inability to handle the traffic, and can see for itself no path around or over that wall. There is nothing for it but to abandon the traditions and increase the efficiency of the apparatus. In the great freight congestion of 1902-3 the first steps towards relief were made, so far as the Pennsylvania was concerned, by the highest officials, possessed of brains and clothed with authority, taking charge of operations and moving the freight. Nothing but the direst distress provoked the injection of the proper elements for relief. If a moiety of the interest charges involved in the securities which the railroads would like to issue could they find the purchasers, were expended in brains, and those brains were given the power of initiative and reasonable authority, the requisite relief would be afforded.

CENTRALIZATION IN THE MACHINERY TRADE.

The approaching completion in both New York and Chicago of large office buildings, practically the whole of which will be tenanted by iron, steel, railway, machinery and closely allied interests, directs attention to the very pronounced tendency toward centralization now prevalent in the selling end of these industries. Indicative of the same trend of affairs are the efforts now being put forth,—with prospects of success—to gather a considerable number of the machinery offices of New York in the great building planned as the terminal of the Pennsylvania tunnels under the Hudson river. Manufacturing and selling concerns apparently welcome the idea of centralization and in the course of a few years, it is safe to predict, all the larger cities of the country will house a majority of these allied interests in a few neighboring structures.

Such an arrangement, however, will involve no radical turning of the industrial current; rather, it will mark the complete realization of tendencies which have been in operation, not only in iron and steel or machinery alone, but in practically all branches of production and distribution. In the pioneer days of manufacturing the selling force was housed at the plant, this practice continuing through the era of distribution exclusively through traveling salesmen. Then came the establishment in the larger cities of branch offices, this plan being forced by the growing necessity of keeping in closer touch with the consumer. Originally the salesman sought the purchaser, and this is still the customary practice, but of late there has been an increasing disposition, especially in the machine tool and machinery trade, for the prospective buyer to visit the factory or branch office and salesroom and to see for himself the various lines of manufacture before closing for his needs. The prospective purchaser of certain machinery or equipment is frequently in the market for other products outside the line of the concern with which he is negotiating; often his needs extend outside the machinery field entirely, into an allied branch of manufacture.

Since the larger cities are naturally the machinery headquarters, the comfort of the customer compels some measure of centralization, and for some time certain limited sections have been designated as "machinery district." The gathering of the clans in a few neighboring buildings is another step in the same direction. The establishment of the machinery exchange, as at Boston, and the organization of the effective machinery club, as at Cincinnati, mark still another of importance. The tendency is one which must rebound to the benefit of both selling house and purchaser, and the spirit which it fosters, in better acquainting business rivals with one another, is thoroughly commendable.

IMPORTS AND EXPORTS.

The quantity of exports of iron and steel from the United States reached the highest point in history in 1906, the statistics of the department of commerce and labor showing aggregate figures of 1,325,157 tons in that year. A comparative statement of the exports for each of the past ten calendar years shows the following:

Year.	Gross Tons.	Year.	Gross Tons.
1897	157,834	1902	370,805
1898	144,595	1903	326,590
1899	942,689	1904	1,167,674
1900	1,154,284	1905	1,010,255
1901	700,857	1906	1,325,157

As to products, the imports included in 1906, 83,317 gross tons of pig iron, as compared with 49,221 tons in 1905; 192,616 tons of crude steel, as against 237,738 tons in 1905, and 328,036 tons of steel rails, as compared with 295,023 tons in the previous year. The total value of exports, not including iron ore, was $172,555,588, compared with $132,930,513 in 1905. Imports showed a substantial increase over the previous year with a total of 584,419 tons in 1906 and 416,000 in 1905. In products these included 379,828 tons of pig iron, 21,337 tons of crude steel and 28,573 tons of structural iron and steel in 1906, as compared with 212,466 tons of pig iron, 14,642 tons of crude steel and 16,147 tons of structural iron and steel in 1905. The 1906 valuation of imports was $34,827,132, against $26,401,283 in 1905.

J. Henry Miller has been re-elected president of the Lebanon Stove Co., Lebanon, Pa. H. A. Reinoehl is superintendent of the concern.

REMARKABLE RECORD

Made in Repairing a Furnace by the Jones & Laughlin Steel Co.

No. 2 furnace of the Jones & Laughlin Steel Co., which burst nine of her 12 1¼ x 7½-inch bands on the night of Jan. 9, tearing out seven-tenths of her bosh, was started again Feb. 7, after an idleness of 29 days and two hours, six days and 12 hours of which was taken up waiting for new bands.

As the accident happened most inexplicably, the pressure being only eighteen pounds, the gas coming through freely, the filling at the time going on as was shown by the fact that the last half of a charge was on the bell and the skip was being filled at the time and there was no apparent slip or settlement of stock, the furnace being in the best of condition, the company on the fourth day after the accident decided to take no chances in putting on the same size bands of which a set was on hand, but to increase them to 2 x 10 inches.

The special steel for these bands had to be made, roll changes put in, the steel rolled, shipped to the Leetsdale works of the Riter-Conley Mfg. Co., pressed, rolls not being able to take this size in, drilled, fitted up and reshipped, making a delay of six days and 12 hours from the time the hearth was cleaned out and bricked up despite the more or less disorganized condition of the labor, on account of the accident.

The work was pushed as fast as possible after the receipt of the bands, and despite the fact of the shortage of labor, especially of pipefitters, in fitting up the bosh and water troughs, and that another furnace had been put out in the mean time and a third one had blown its bell, hopper and top rigging off, the furnace was blown in in 22 days and two hours of actual working time, as there was absolutely nothing done for the six and one half days during the wait for the bands.

This is about the best record that has been made on a repair of this character, especially considering the conditions under which it was carried out. The furnace is 100 x 22 feet and was in perfect condition above the mantle.

The steamer J. H. Bartow, named after Capt. J. H. Bartow, of Cleveland, president of the Lake Erie Ore Co., was launched at the Wyandotte, Mich. yard of the American Ship Building Co. recently. The steamer Bartow is building for the Erie Steamship Co. and will have a carrying capacity of 9,000 gross tons. She is 524 feet over all, 504 feet keel, 24 feet beam and 30 feet deep. She will be ready to go into commission at the opening of navigation.

GENERAL INCREASE

IN FREIGHT RATES IS BELIEVED TO BE IMMINENT.

Traffic Officials Start Movement In Chicago.—Trunk Lines Consider Advance.—Hill Talks.

A general increase in freight rates throughout the country is believed to be imminent. The first step along this line was taken at a meeting in Chicago, Feb. 5, attended by executive officials of railroads aggregating 100,000 miles of trackage. The plan which the officials discussed and are now considering, is to increase the rates of nearly all of the main commodities fully 10 per cent by increasing the minimum which is permitted to be loaded into a freight car. The railroads interested in the initial movement extend in all the territory east of Chicago and north of the Ohio river, clear to the seaboard and north into Canada. Traffic officials state that although the added revenue from such a ruling would be large, it would not be sufficient to offset even the increased expense to the railroads occasioned by advanced wages and increased cost of equipment.

The Pennsylvania railroad system and other trunk line railroads, it is thought, are now considering an increase averaging 10 per cent on freight rates of bituminous coal and other heavy commodities. Bituminous coal interests of Pennsylvania, Maryland, Virginia and West Virginia have been informally advised that in making their contracts for the next coal year, which begins April 1, they should understand that the railroads do not guarantee continuance of the present freight rates. Some of the commodities which are liable to be affected by the increase include iron ore, coke, limestone for flux, cement, sand and probably pig iron, finished iron and steel products. The railroads concerned in the movement include the Pennsylvania, Baltimore & Ohio, Reading, Jersey Central, New York Central lines, Erie, Lackawanna, Lehigh Valley, Chesapeake & Ohio and Norfolk & Western.

James J. Hill, president of the Great Northern, is quoted as saying that an advance in freight rates seems inevitable. "It may come first in the eastern trunk lines, but it will probably spread all over the country," says Mr. Hill. "Wages of labor and the prices of materials and operating conditions have been making steadily for smaller net earnings. The commodities of the country have been advancing in price, while transportation rates have been showing decreases. This is an order of things which cannot last, and the time is at hand when an advance in rates is unavoidable."

Wonderful Earnings.

The Financial Chronicle estimates that the increase in gross earnings of the entire steam railroad system of the country for 1906 over 1905 was $240,000,000, of which $135,000,000 was made in the first six months, and $105,000,000 in the last six months. *The Chronicle* adds:

"Let the reader ponder well what such an addition—almost a quarter of a thousand million dollars—means. Let him recall further that in 1905 we put the increase for the full mileage at $180,000,000 and that in the same way we estimated the increase for 1904 at $10,000,000. Furthermore, that previously we computed the gain for 1903 at $210,000,000; for 1902 at $105,000,000; for 1901, $155,000,000; for 1900 at $120,000,000; for 1899 at $140,000,000; for 1898 at $90,000,000 and for 1897 at $75,000,000. It will be seen that we have here an aggregate improvement for the ten years from 1896 to 1906 in the prodigious sum of $1,325,000,000. In other words, aggregate gross earnings of United States railroads for 1906 were $1,325,000,000 larger than they had been in 1896, the year of trade prostration and of the silver campaign."

New Line to Lakes.

The Carter Construction Co., Pittsburg, has been awarded a contract by chief engineer Samuel Rockwell, of the Lake Shore & Michigan Southern road for the construction of a line from Mill Creek Junction, near Cleveland, to Kent, O., a distance of 26 miles. The awarding of this contract is the first step in the actual construction of the extension of the Pittsburg & Lake Erie's new railroad from Youngstown to Cleveland, and will give that company a through line from Pittsburg to the lakes.

Marvel of Progress.

The Baldwin Locomotive Works, Philadelphia, finished its 30,000th locomotive recently and a pennant was hoisted over the plant in honor of the event. The engine was for freight service for the Pittsburg, Shawmut & Northern railroad. The Baldwin works was established in 1831 and it required one year for it to build its first locomotive which weighed five tons. The 30,000th locomotive just completed was constructed in less than three months and it weighs 289,000 pounds.

COLUMBUS EMPLOYERS

Organize Industrial Alliance for Handling Problems of Manufacturers.

Forty employers of Columbus, O., have organized the Columbus Industrial Alliance for mutual assistance and benefit. The officers chosen by the organization are: Col. J. G. Battelle, president; D. B. Neil, first vice president; J. W. Jeffrey, second vice president, and George T. Spahr, treasurer. Promotors of the organization announce the following as its objects:

To assist by all lawful and practical means the properly constituted authorities of the state and nation in maintaining and defending the supremacy of the law and the rights of the citizens.

To assist the members of this alliance and their employes in resisting encroachment upon their constitutional rights.

To promote and encourage harmonious relations between employers and their employes upon a basis of equal justice to both.

To assist local, state and national associations of manufacturers, employers and employes in their efforts to establish and maintain industrial peace, and to create a public sentiment in opposition to all forms of violence, coercion and intimidation.

To foster and encourage by legitimate means individual enterprise and freedom in the management of industry.

The adoption of a uniform and legitimate system whereby members may ascertain who is, and who is not, worthy of their employment.

The investigation and adjustment, by the proper officers or committees of the alliance on any question arising between members and the employes, when such question shall be submitted to the association for adjustment.

To protect its members in such manner as may be deemed expedient and proper against legislative, municipal and other political encroachments.

Labor Notes.

The American Foundry Co., Leipsic, O., was obliged to shut down recently by a strike among the men.

A settlement of the strike of the boilermakers and laborers of the Pennsylvania Engineering Works, New Castle, Pa., has been effected and 200 men have returned to work. The settlement was satisfactory to both sides.

The skilled mechanics of the Shenango plant of the American Sheet & Tin Plate Co. have presented a demand for more wages, giving as their reason the increased cost of living. Laborers recently were given an advance of 10 cents a day. Those making the demand are the plumbers, pipe fitters and pot makers.

PERSONAL.

S. S. Cunning has been made assistant manager of the St. Louis Blast Furnace Co.

F. A. Goodrich, St. Louis manager of sales for the Jones & Laughlin Steel Co., is spending the winter at Pasadena, Cal.

J. C. Miller has resumed his former position as sales agent of the Columbus Iron & Steel Co., Columbus, O.

Charles A. Moore, of Manning, Maxwell & Moore, New York, has sailed for an extended tour abroad.

President J. W. Duntley, of the Chicago Pneumatic Tool Co., has returned from a four week's tour of Europe.

W. J. Langenheim has succeeded R. C. Frampton as secretary and treasurer of the Ruud Mfg. Co., Pittsburg, Pa.

C. W. Owens has been appointed sales agent of the Virginia Iron, Coal & Coke Co., with office at Bristol, Va.-Tenn., vice Guy Darst, resigned.

James P. McKinney was elected a director to succeed William S. McKinney, and George T. Reiss a director to succeed Godron Shillito at the annual meeting of the Niles-Bement-Pond Co.

J. B. Halloway, who has been connected for some time with the Philadelphia branch of Rogers, Brown & Co., has taken the agency in that city of N. S. Bartlett & Co., of Boston, and will make a specialty of Virginia and Pennsylvania irons.

Edward Phelps Allis Jr., a son of the late Edward P. Allis, of Milwaukee, Wis., has had conferred upon him the knighthood of the Legion of Honor, by the French government, in recognition of his researches in science.

Frederick P. Kafka has resigned his position as manager of the New York office of the Unit Concrete Steel Frame Co. to accept a similar one with the General Fireproofing Co., Youngstown, O., whose New York office is at 156 Fifth avenue.

S. A. Carson has become associated with the Iron City Coal & Coke Co., Pittsburg, Pa., and will have charge of the coke department. Mr. Carson has been connected with McKeefrey & Co., Leetonia, O., and was formerly with the H. C. Frick Coke Co.

Fred J. Miller has tendered his resignation as editor of *The American Machinist*, and is succeeded by F. A. Halsey. Mr. Miller had been a member of the editorial staff for 20 years and had been editor for a number of years. Mr. Halsey has been a member of the staff 12 years.

Edward K. Judd, who recently resigned his position as a member of the editorial staff of the *Engineering and Mining Journal*, has been succeeded by John T. Glidden, formerly an assistant in the mining department of the Massachusetts Institute of Technology.

C. E. Williams, former superintendent of the American Steel & Wire Co.'s plant at Rankin, Pa., has resigned as mechanical engineer of the Pittsburg Steel Co., Monessen, Pa., in order to devote his time to the final development of an improved rolling mill system on which he has been working for the past eight years.

LATE NEW YORK NEWS.

(Special Telegram.)

New York, Feb. 13.—The Lehigh Valley has closed with the leading interest for a small additional rail tonnage and other lines are expected to add to their purchases shortly. There is a heavy volume of inquiry, largely from trolley lines, which are the heaviest contributions to current business. Sales of the week mostly for small lots aggregate 8,000 tons.

Frederick F. Fuesserich, treasurer of the Hendy Machine Co., Torrington, Conn., has been elected president as well to succeed the late Henry J. Hendy. Charles H. Alford has been made vice president and general manager and Frederick N. McKenzie has succeeded him as secretary.

The Lackawanna Steel Co. blew in its No. 7 furnace at four o'clock Tuesday.

PIG IRON PRODUCTION

Was Heavy Last Month in Spite of Some Embarrassments.

According to figures compiled from reports of 376 blast furnaces, there was a production of pig iron during the month of January amounting to 2,121,929 tons, which is but slightly less than the record production in December. With this rate of production continued throughout the year the 25,000,000 mark will be easily reached. These figures do not include the charcoal iron production figures, which amount to something less than 40,000 tons a month. They do include 11,329 tons of ferro-silicon and spiegel.

FURNACE REPORT.

State	No. of Stacks	No. in Blast	Actual Make. Steel Co.'s.	Merchant Co.'s.	Total.
Pennsylvania	144	120	93,169	218,104	911,273
Ferro			5,137	.....	5,137
Ohio	61	56	338,288	151,015	489,303
Ferro			.....	1,425	1,425
Alabama	44	37	62,064	70,127	132,761
Virginia	21	13	17,923	21,177	39,100
New York	23	19	66,046	74,203	140,249
New Jersey	11	9	.....	15,536	15,536
Tennessee	18	13	.....	.....	.....
West Virginia	4	2	64,002	33,445	97,447
Kentucky	6	3	.....	.....	.....
Ferro			.....	1,950	1,950
Maryland	4	4	.....	.....	.....
Spiegel			.....	.....	.....
Illinois	22	21	217,868	4,560	222,428
Wisconsin	5	5	.....	.....	.....
Colorado	5	5	.....	.....	.....
Spiegel			.....	.....	.....
Georgia	1	0	.....	.....	.....
Michigan	1	1	.....	.....	.....
Minnesota	1	1	.....	14,090	14,090
North Carolina	1	0	.....	.....	.....
Missouri	1	1	.....	.....	.....
	376	320	1,481,247	640,682	2,121,929

The small number of idle furnaces as indicated by the report which shows 320 in blast, is unusual and accounts for the large production. However, a number of furnaces were blown out for relining and repairs toward the end of the month, which will probably mean a somewhat lessened output in February. The relative activity of the various states and districts in the matter of production based on the greatest activity possible to each is fairly uniform and is approximately 80 per cent of the total capacity.

The production of merchant furnaces as compared with the output of steel company furnaces shown in the aggregate by the figures, 640,682 gross tons and 1,481,247 tons, shows a slight falling off. Considerable difficulty was experienced with southern Ohio furnaces in the matter of coke supply during January because of floods and all the Ohio river furnaces were banked for short periods of time.

DEATH OF EX.-GOV. HIGGINS

Recalls Some Interesting Mining History.

Frank Wayland Higgins, former governor of New York, died at his home in Olean, N. Y., Feb. 12, from heart disease.

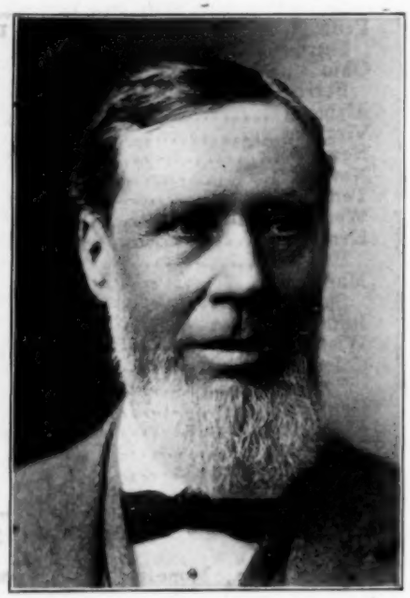
An interesting part of the business activities of ex-Governor Higgins was his connection with the iron ore lands of Minnesota. In the early days of exploration in Minnesota, O. T. Higgins, the father of the ex-governor, bought a great many scattering tracts of land from the government, paying $1.25 per acre. The lands were picked up at random with no particular idea of any present value, for they had none at that time. For the most part, in fact, they were lands which had been passed over as having no value for timber on them. Since that time, the same timber has become a valuable asset. Like most of the country thereabouts, the land was hilly and stony, and seemed to offer no prospect for agricultural purposes. The seriousness, therefore, from a business standpoint, with which Mr. Higgins acquired these lands is a matter of considerable question, as evidenced by the later organization of a holding company called the Higgins Wild Cat Co., the name voicing soomewhat the spirit of the venture.

The discovery of iron ore in later days developed an immense value for these lands, as some of the richest ore deposits in St. Louis county have been located on and adjoining the holdings of the Wild Cat company. At the demise of his father, ex-Governor Higgins succeeded to these properties, two of which, known as the Higgins No. 1 and Higgins No. 2, have been prominent in the list of producers. In the Higgins No. 1 mine, Mr. Higgins held a one-half interest and in the Higgins No. 2 a 5-24 interest. Besides this, the estate has a 5-24 interest in each of the following properties: the southwest quarter of section 24-58-17; northeast quarter of the southwest quarter of section 9-58-17; northeast quarter of section 26-58-17, upon which mines have not been developed, but in all probability exist since the properties adjoin valuable deposits. Lands in section 20-58-20; 22-58-20; 30-58-20, adjoining the Morrow mine, and also in 9-58-16 adjoining the McKinley mine are owned. Stock is also held in the Irondale Land Co. and the Clean Land Co.

Although represented in Duluth by Giles Gilbert, Mr. Higgins made many visits to Minnesota, indicating his personal interest in the development of the iron mining industry beyond simply financial considerations. It will be seen from the description of the above properties that the extent of Mr. Higgins' wealth in the matter of ore lands alone was not only large, but will not cease to increase until there is a complete development of the properties in which he was interested.

DEATH OF THOS. F. GRIFFIN.

Thomas F. Griffin, founder of the Griffin Wheel Co., died of pneumonia. Monday, Feb. 11, at the home of his daughter, Mrs. P. J. Geraghty, in Chicago, after an illness of only 36 hours. The body was conveyed to Detroit and buried Wednesday in Mt. Elliott cemetery. Six children survive him, T. A. Griffin, president of the Griffin Wheel Co., Chicago; P. H. Griffin, Buffalo;



THOMAS F. GRIFFIN.

Mrs. P. J. Cullen, Buffalo; Mrs. E. C. Walker, Walkerville, Canada; Mrs. A. W. Brewster, Washington, D. C., and Mrs. P. J. Geraghty, Chicago.

Deceased was well known throughout the country because of his prominence as a car wheel manufacturer. A history of his life is almost a history of the car wheel business in America. He was born in county Limerick, Ireland, Dec. 18, 1826. Eight years later, the family removed to the United States and located at Rochester, N. Y. In the foundry of Traver & Benedict in that city, Mr. Griffin served his apprenticeship as a molder. In 1848 upon the admission into the firm of William Kidd, a pioneer in the car wheel business, the company engaged in the manufacture of wheels under the Washburn patents, which cover the present double-plate wheel in universal use today. This dates Mr. Griffin's first connection with the car wheel business, but from that year he has been continuously identified with it. He remained in Rochester with the Kidd foundry as the firm was afterwards known, until 1873, when he removed to Detroit to take charge of the foundry of the Michigan Car Co., since absorbed by the American Car & Foundry Co. This was the first wheel plant to be started west of the Hudson river, and to Mr. Griffin belongs the credit of being the first practical wheel foundryman to locate in that territory. At that time there were only four firms engaged in the manufacture of car wheels, one plant being at Worcester, Mass., which was the old Washburn foundry; another at Jersey City; the Kidd foundry at Rochester, and the plant of Jagger, Treadwell & Perry at Albany, N. Y. Shortly after coming to Detroit, Mr. Griffin severed his connection with the Michigan Car Co. to engage in business for himself; and in 1875, he incorporated the Griffin Car Wheel Co. The original plant had a capacity of 18 wheels per day. From this small beginning, under his practical and able management, and later under that of his son, the present head of the concern, the company's output has increased to 6,000 wheels, with plants located in Boston, Detroit, St. Paul, Kansas City, Denver, Tacoma, and three in Chicago.

Hugh McMillan, brother of the late Senator James McMillan and one of Detroit's prominent capitalists, died in that city Feb. 10. He was connected with a number of industrial enterprises during his life, including the Fulton Iron & Engine Works, Detroit Iron Furnace Co., Detroit Pipe & Foundry Co., Newberry Furnace Co., Detroit Iron Mining Co., Baugh Steam Forge Co. and other concerns which he had served in responsible official capacities at various times. He was best known through his connection with transportation companies.

James Dwyer, formerly superintendent of the Johnson & Bassett Co., Worcester, Mass., died at his home in that city, Feb. 1, after an illness of three days of pneumonia. He was an expert machinist and had been in the employ of the Johnson & Bassett Co. for 31 years.

Isaac M. Hutchison, aged 42, president of the Mexican Car & Foundry Co., president of the American Railway Supply Co. and one of the most prominent American citizens of the Mexican republic, died at San Antonio, Tex., Jan. 31, as a result of an operation for appendicitis, complicated with an attack of pneumonia. He is survived by two young children.

Mannis Hilb, of the firm of Hilb & Bauer, Cincinnati, died Jan. 29, at the age of 62. He is survived by two sons.

NEW PLANT OF THE DETROIT STEEL CASTING CO.

A WELL EQUIPPED FOUNDRY OF FIREPROOF CONSTRUCTION.

Open Hearth and Converter Steel Castings Manufactured.—Facilities Adapted to General as Well as Special Work.

By an Editorial Representative of The Iron Trade Review.

The plant just completed, which has been built by the Detroit Steel Casting Co. to replace the one destroyed by fire Feb. 19, 1905, was constructed with the primary object of obtaining a complete and modern steel casting foundry of adequate size and perfectly fireproof. In this attempt splendid success has been attained. The location on the Bay City division of the Michigan Central where it crosses Michigan avenue, provides excellent shipping facilities. All of the buildings, including the office which faces Michigan avenue, are of heavy brick and steel construction, and are arranged as shown in Fig. 2, which is a layout of the whole plant. A large variety of work is handled, but a specialty is made of steel castings for marine engines and dredging machinery, railroad car castings and knuckles for car couplers. The foundry has an average daily capacity of 60 tons of finished castings.

No attempt has been made to provide a foundry of unique features, but ease and efficiency of operation under working conditions have been carefully planned for in every detail of the arrangement of yards, buildings and equipment. The main foundry building is a steel structure with heavy brick walls 500 feet long and 165 feet wide, built with three longitudinal bays. The arrangement of the floor space for the various classes of work and requirements is indicated in Fig. 2. Practically all of the molding is done in the wide, roomy and high middle bay. This bay is about 40 feet from floor to roof and has, therefore, as good ventilation as possible. It also receives the full benefit of the specially designed roof in the matter of superior light. As shown in Fig. 1, which is a bird's eye view of the plant, the roof of every third cross sectional bay is lowered, which arrangement provides for the placing of vertical windows on all four sides of the elevated bays, permitting the ingress of light from all directions.

The middle portion of the bay is used as the pouring floor, with the dry sand molding in the metal flasks on one side and the green sand molding, largely with metal patterns, on the other side. It will also be noted that in the side bays are the open-hearth furnaces on one side and on the other side the drying ovens directly opposite and adjacent to the pouring floor, affording the easiest possible handling of metal and molds.

Adjoining the green sand casting floor is the cleaning floor, where the castings are dumped from the flasks as soon as cooled. The reason for having the green sand and dry sand molding so located with regard to the rough cleaning floor arises from the fact that the quick-cooling green sand castings in the wooden flasks are immediately at hand to be dumped first and gotten out of the way before the dry sand castings are ready. At the same end where the castings are cleaned, so that but slight traveling with the castings is necessary, is a large double annealing furnace built in the ground. It is constructed of fire-brick and the over-all dimensions are 12 x 48 feet by 8 feet deep. The furnace has two heating

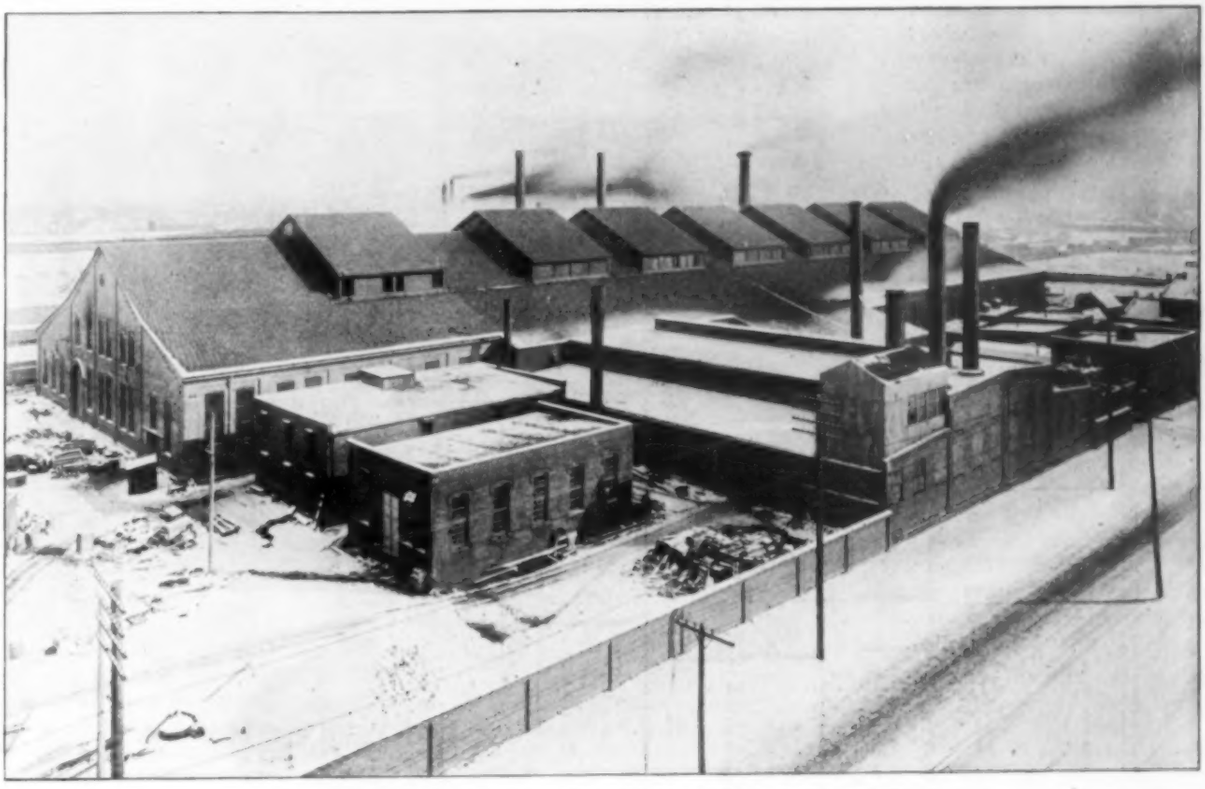


Fig. 1.—Bird's-Eye View of Detroit Steel Casting Co.'s Plant.

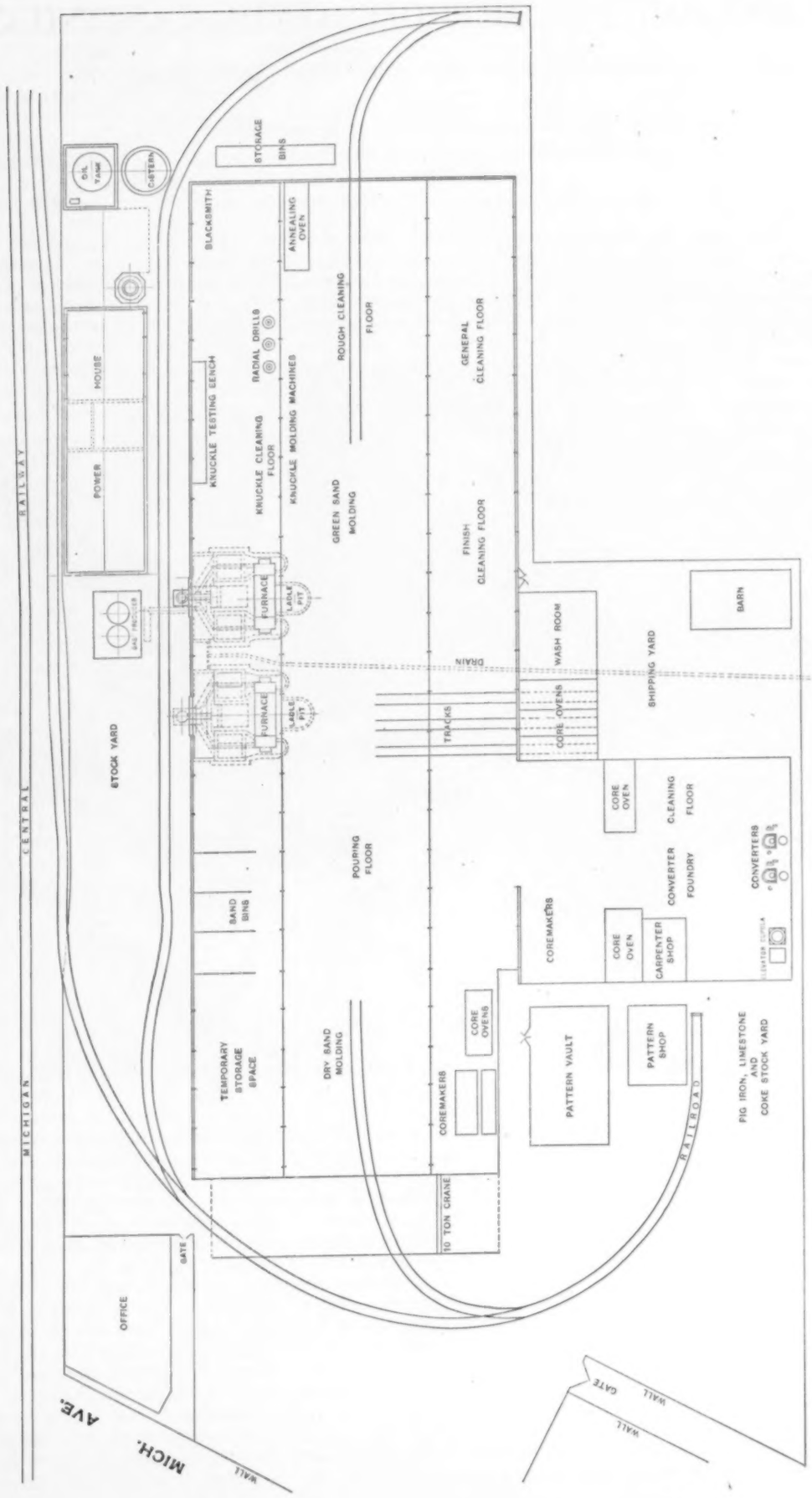


FIG. 2.—GROUND PLAN OF PLANT, DETROIT STEEL CASTING CO.

chambers with a fireplace at each end, both of which are provided with a grate for burning either oil or coal. One end of it is fired from the outside of the foundry, the furnace projecting through and under the wall. The heating chambers are in the middle of the furnace, separated by a transverse fire-brick wall, as shown in Fig. 3. The heat passes from the fire box over a low fire wall into the heating chamber, the draft being out at the rear end through flues which lead underground to a chimney. The walls rise a foot and a half above the floor and are crowned with a cast iron plate which runs the entire length and affords a durable support for the arched roof of the furnace. This roof consists of cast iron covers in the form of circular segments about 42 inches wide. Each segment is provided with a hook to facilitate lifting on and off by the cranes. A large plate, which fits into the bottom of the furnace, is loaded with the castings to be annealed and picked up by the crane and placed in the furnace, so that a large number of pieces are thus handled with one operation.

The middle bay can be served throughout its entire length by any one of the five cranes which span it. Two of these are of 30 tons capacity and three of 10 tons, all electrically operated. One 30-ton crane was built by the Northern Engineering Co., Detroit, and the other by Pawling & Harnischfeger, Milwaukee, while the three smaller cranes were built by the Northern Engineering Co., Detroit.

The open-hearth furnaces occupy the middle part of one of the side bays, being located, as mentioned above, at a point where the metal can be distributed most easily for pouring. A view of the furnace installation is shown in Fig. 4. There are two furnaces, each with a rated capacity of 15 tons, though they are commonly worked up to 18 and 20 tons. The basic process is used here, as is coming to be the more common practice generally, because of the greater ease in manipulation and economy, one evidence of this latter feature being the possibility of buying high phosphorus scrap, which can be used in the basic open-hearth process, at a lower price than that at which the scrap from the basic open-hearth castings, a low phosphorus product, can be sold to foundries where the acid process is used.

Oil is used as a fuel for heating throughout the foundry, and in the open-hearth furnaces two oil burners of the Kirkwood type are used, one on each end. A temperature of from 2,800 to 3,000 degrees is maintained in the furnace with no additional heating device, and about six hours is required for melting the charge. Every 15 minutes the burners, which work one at a time, are reversed in connection with the operation of the regenerator chambers located beneath the furnaces and the opposite wall and underneath the foundry flooring. For each furnace there are two of these regenerators, the one for air being 12 x 9 x 6 feet, and the one which has been provided for the possible use of producer gas as a fuel being 19 x 9 x 4 feet. The operation of the regenerators is controlled from above by means of valves and levers, which provide for the reversing of the current of gases as the burners are alternated.

Each furnace has three charging doors and a Wellman-Seaver-Morgan charging machine handles the scrap for the furnace in the usual way. The purchased scrap is stored in the yard at a convenient point, so that, with the trackage facilities provided, the loaded charging trays may be weighed and run in to the charging machine. Part of the scrap used from the foundry is stored inside near the furnaces, and there are scales installed for its convenient weighing. Analyses of the charge and the metal are made daily and submitted to the office, the company's own laboratory being installed at the plant.

The casting pit directly at the rear of the open-hearth furnace is in the middle bay in the pouring floor mentioned above. There are three casting ladles, each of 20 tons capacity, which are heated in preparation for pouring by oil burners. They are of the ordinary type, as shown in Fig. 5 taken during the pour.

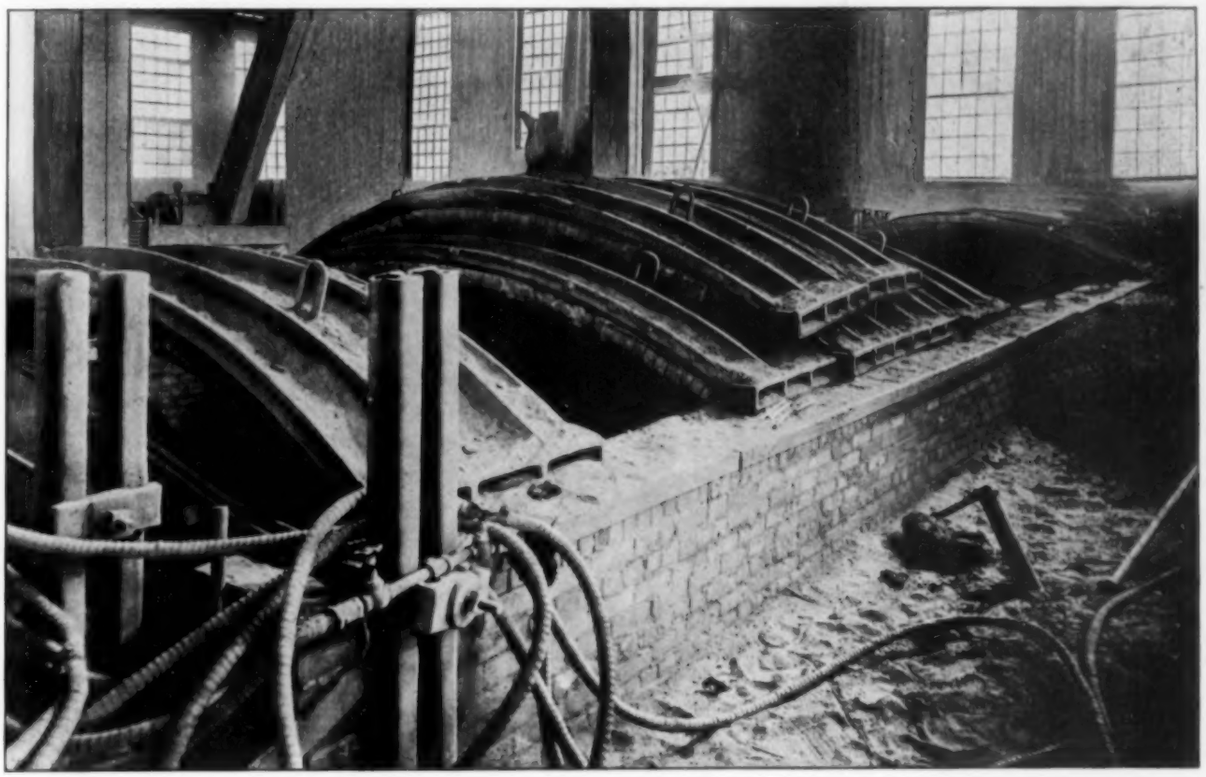


FIG. 3.—ANNEALING OVEN FOR LARGE CASTINGS.

In the same bay farther to the front of the foundry are the bins for sand, the greater portion of which is obtained from the Massillon district. In front of the bins are three American Clay & Machinery Co.'s sand grinding pans, electrically driven, one with a 5-foot, one with a 7-foot and one with an 8-foot pan. The extreme end of this side bay is used for a temporary storage of the flasks and patterns. At the other end of this bay, beyond the open-hearth furnaces, a small space is allotted to the repairing of the flasks that may be more or less damaged by use, and also a space is given for the cleaning of the car coupler knuckles. In the middle bay, adjacent to this cleaning space, are eight Maywood Foundry & Machine Co. molding machines, with which the knuckle molds are made. These molding machines are of the type operated entirely by hand. The casting and cleaning operations are accomplished side by side and the knuckles are then ready for testing, a wall bench fitted with a number of couplers being installed nearby, so that every piece that leaves the foundry is ready for immediate service. Three 42-inch radial drills built by C. C. Wormer, Detroit, are conveniently located for reaming out the knuckles preparatory to testing them. A large steel rumbler, motor driven, is also a part of the equipment of the knuckle cleaning department. A Williams-White 1,500-pound press has been installed for straightening railroad car center plates, avoiding the former method of straightening by the blacksmith. A small blacksmith shop, however, is located at the extreme end of this bay for such work as is required.

The location of the drying ovens in the bay on the opposite side, with regard to the pouring floor, has been mentioned, but in reality these drying ovens are in a wing built to the main foundry, the other part of which is used for an employes' washroom. These drying ovens are three in number, and are about 8 feet high x 15 feet wide and 40 feet deep. They are heated by oil burners located at each corner, in front of the oven. The doors of these ovens are of jointed sheet metal and can be rolled up into hangers when the oven is not in use. The tracks on which the trucks carrying the molds are run into the ovens extend out into the pouring floor in the middle bay.

In the front end of this bay is the core makers' room. A core makers' bench extends along the column side of the bay and on the wall side are three core ovens set parallel to the wall with tracks running through them to provide for the handling of cores in and out. These ovens are also heated by oil burners through flues which pass underneath the oven and open upward in the bottom. In the accessible wall of the ovens a number of small compartments are built, as shown in Fig. 6, each compartment having an iron door through which small cores may be set in. There are 12 of these wall shelves in one oven and 16 in the other, thus providing a much more efficient use of the wall space than otherwise possible. Racks also are installed in the ovens for the drying of a number of the cores, utilizing all available space.

At the other end of the bay, the cleaning of the finished castings is done. Deliveries are made from this department, the building and yards being planned with shipping facilities to meet this arrangement. In cleaning the castings, a great many air tools are used for chipping, and space is allotted nearby for the dressing of chisels as repairs become necessary. A considerable number of tools are installed to aid in cleaning, saws, shapers and grinding machines, among which are five swinging emery grinders. Throughout the foundry the tools are driven either by individual motors or group drive, the electrical installation being partly Westinghouse and partly Fisher Electric Co. of Detroit. Spanning this bay are three five-ton electric cranes, two built by the Browning Engineering Co., and one by the Fisher Electric Co., and over the bay on the opposite side is another five-ton Browning crane.

The converter castings department, shown in Fig. 7, which was a part of the

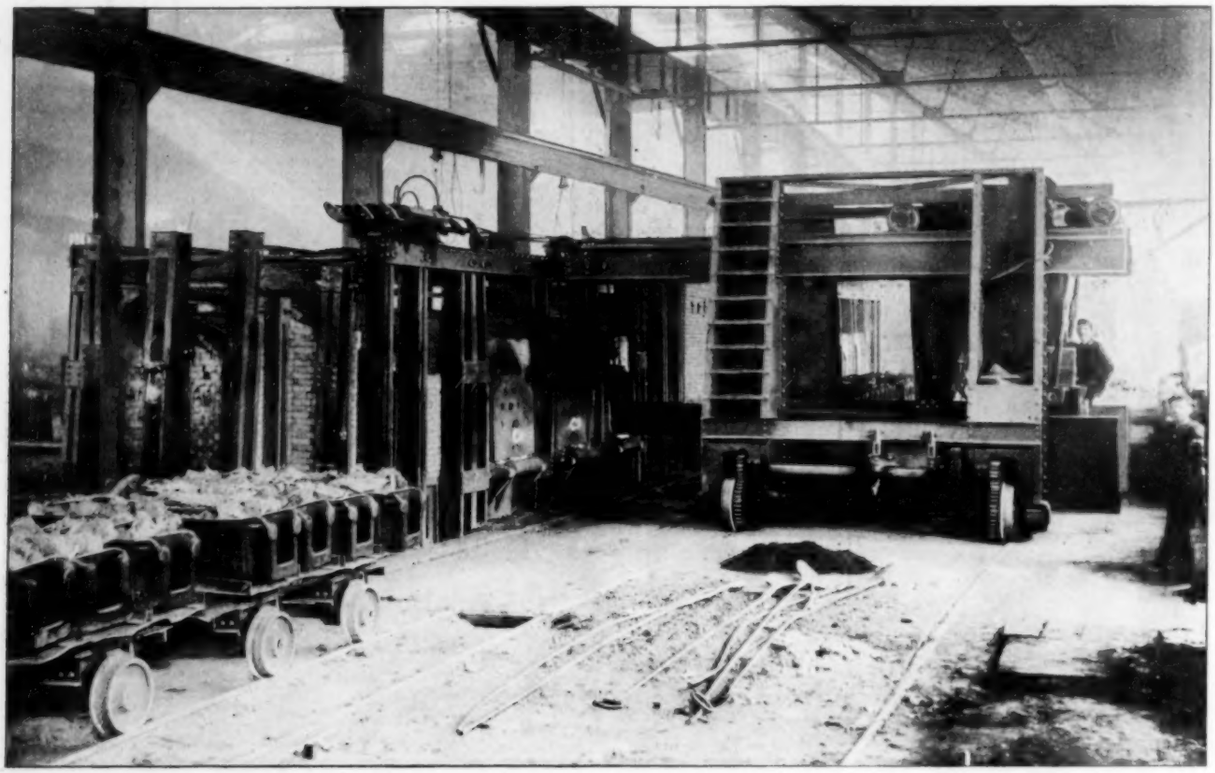


FIG. 4.—OPEN-HEARTH FURNACES.

old foundry and which can now be operated entirely separate from the main foundry, is located in what is now a wing of the main building, extending, as indicated in Fig. 2, from the northwest corner. In this department the smaller acid castings are made, such as those required in automobile construction. Two 11.2 ton Robert converters, electrically operated, supply the metal. The tilting of the converters is accomplished through a driving mechanism consisting of a worm wheel and gear with a reducing gear and pinion connected to an individual motor. The converters use a blast of 3½ pounds pressure per square inch, air being stored in a cylindrical tank, which is suspended in a horizontal position directly under the roof of the building. The pig iron for the converters is melted in a 54-inch Colliau cupola, which is located alongside the converters. Blast for the cupola is furnished by a motor-driven Sturtevant blower. An electric elevator alongside the cupola provides the means for access to the charging floor. Directly in front of the elevator is a Fairbanks floor scale for weighing the material used, coke, pig iron and limestone being stocked in the yard immediately outside of this end of the building, so that they are directly at hand. In front of the converters a room has been enclosed for such carpenter work as may be necessary. The molding floor occupies the central portion of the wing. At the same end, but on the opposite side from the converters, are annealing ovens, and conveniently located with respect to the delivery door, which opens into the same shipping yard as mentioned in connection with the main foundry, are a number of bins for the storing of castings ready for shipment. On the same side of this foundry is a cleaning department, where all the hand cleaning is done with pneumatic chippers and where a number of saws, stationary and portable emery grinders, are installed. The tools for this cleaning department are driven by group drive from a large Westinghouse motor. Two Fisher cranes are available in this department for the movement of molds and material. At the inside end of this wing facing each other, one on each side of the room, are two large core ovens capable of handling all the work of this department, and so located that a minimum of time is lost in moving material. This department also has its own core room.

The pattern shop and pattern storage vault are conveniently located with reference to the foundry, and have been constructed as nearly as possible fireproof. In the pattern shop, as well as elsewhere in the plant, the tools are electrically driven. The shelves in the vault for storing the patterns are made of expanded metal with wrought iron pipe uprights. The windows are covered with ordinary Kinnear fire doors, and, in every respect, the construction is adapted to the safety of the patterns. This building is two stories high.

The power house, which is located alongside of the railroad with the resultant advantages of coal and ash handling, is a brick building 140 feet long by 42 feet wide. There are installed in the boiler house three 200-horsepower water-tube boilers, equipped with automatic stokers and built by the Ricard Boiler & Engine Co., Toledo, O. The feed water is supplied through a Cochrane hot water heater. Between the boiler room and the engine room, which are in the same building, is considerable space devoted to locker and storage rooms, preventing the dirt of the boiler house from entering the engine room. The engine

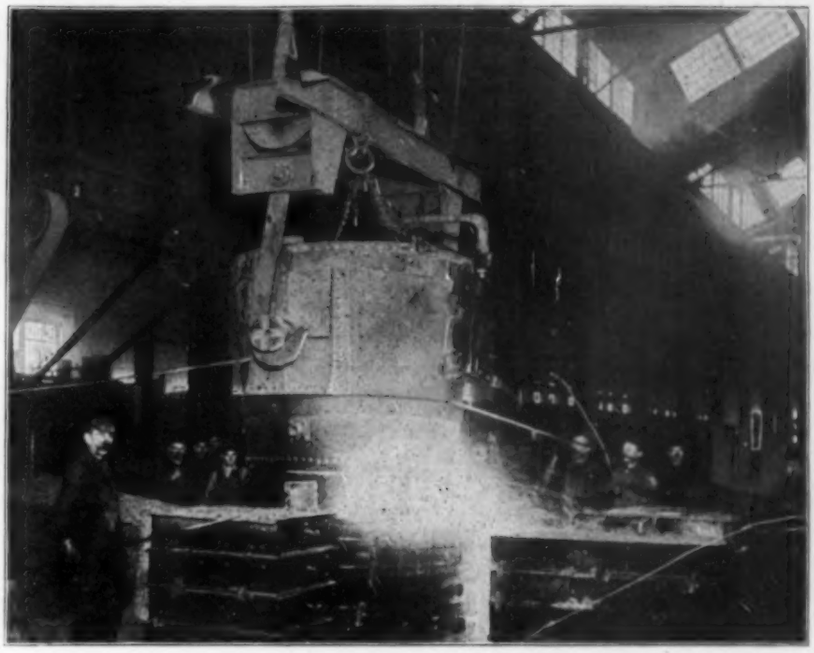


FIG. 5.—POURING FROM THE 20-TON LADLE.

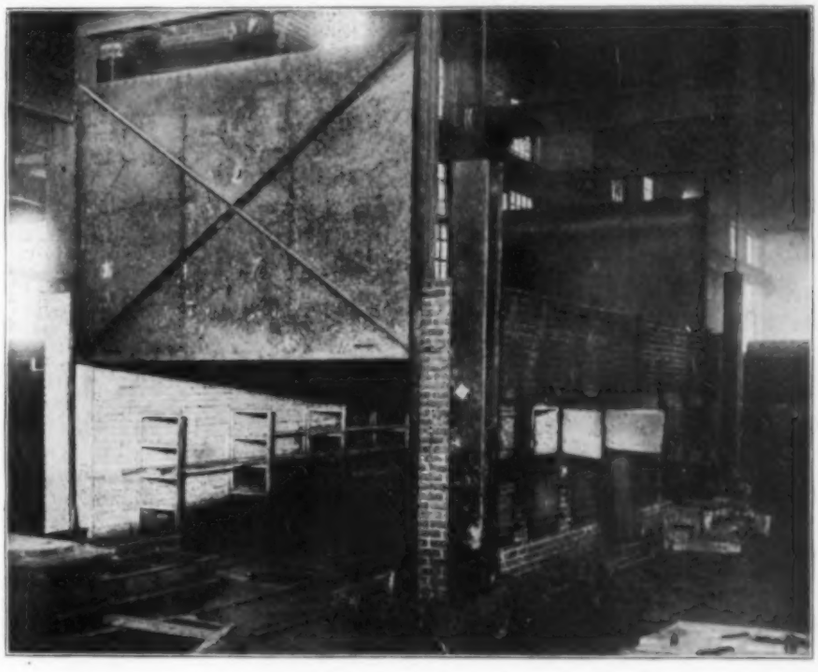


FIG. 6.—CORE OVEN IN MAIN FOUNDRY SHOWING SIDE DOORS.

room itself is finished in white brick with tile floor, and presents a pleasing appearance. Power is developed by two Skinner engines, one driving a 250-kilowatt General Electric generator, the other a 125-kilowatt Westinghouse generator. A 30-kilowatt Akron machine, direct-connected to an Erie engine, is used as an auxiliary unit. For the pneumatic tools used in the cleaning department of the foundry, two Ingersoll-Rand air compressors have been installed, having a capacity, respectively, of 610 and 1,020 cubic feet of air per minute. The blowing engine for supplying the blast to the converters is of the vertical type, built by the Wymer Machine Co. of Lebanon, Pa. The several electric motors, together with the lighting, constitute the load on the power plant. An oil storage tank, having a capacity of from 600 to 800 barrels, from which oil for all the heating in the foundry is supplied, stands just at the rear of the boiler room.

Immediately in front of the power house is a gas producer plant, which, though it has never been used owing to the great satisfaction obtained from the use of oil as a fuel, is located in line with the open-hearth furnaces in the foundry, for which it is intended to supply fuel.

The yard facilities for serving the foundry have been looked to as carefully as the arrangement in other particulars. A system of trackage has been laid out, as shown in Fig. 2, so that the main foundry can be entered from either end for the handling of scrap or castings directly into railroad cars and a 10-ton Browning Engineering Co.'s locomotive crane operates in the yard. Across the entire front of the foundry, 165 feet and with a span of 40 feet, a 10-ton yard crane has been erected, which consists of an air hoist mounted on trucks to be hauled along the crane runway by hand. This is for the handling of flasks, patterns and lighter loads.

The various materials required for the different departments of the foundry are conveniently stocked about the buildings in the yard. At the rear of the foundry is a row of 37 storage bins, in which every variety of car coupler knuckles properly classified is kept in stock, an attempt being made to have 1,000 of each of these on hand at all times. This plant was designed by the Garrett-Cromwell Engineering Co. of Cleveland, and built by Whitehead & Kales Iron Works, Detroit, with the exception of the power house, which was built by the Russell Wheel & Foundry Co., Detroit.

FIG. 7.—CONVERTER CASTINGS DEPARTMENT OF FOUNDRY.

Theory vs Practice.—Wilson E. Symons, president of the Pioneer Cast Steel Truck Co., 914 Postal Telegraph Building, Chicago, addressed the Engineering Assembly of Purdue University, Lafayette, Ind., on Jan. 31. Mr. Symons chose for his subject, "Theory versus Practice in the Work of the Mechanical Engineer." Drawing upon an extensive personal experience, he presented his subject in a manner which was most interesting and instructive to his student audience. He described the helplessness of a man trained in theoretical matters only, discussed with care and discrimination the limitations which surround one whose entire stock in trade is his practical experience, and drew a fine picture of the opportunities which await the one who combines the theoretical with the practical. Such a combination he regarded as essential to the development of the ideal engineer.

OUR PRESENT WEIGHTS AND MEASURES AND THE METRIC SYSTEM.[1]

By Henry R. Towne.[2]

Since 1816, when President Madison in a message to congress stated that "no adequate provision has yet been made for the uniformity of weights and measures contemplated by the constitution," the question thus implied has been frequently in a state of unstable equilibrium. On the one hand, usuage and legislation by the states have established and confirmed our present system of weights and measures, but, on the other hand, the advocates of the metric system have persistently sought to secure its compulsory adoption. Congress in 1866 legalized its use and it has since been taught in our schools, and the development of modern science, especially in the field of electricity, has necessitated the creation of many new measures, which usually have been based on metric units. Is it not time, therefore, that the vitally important questions thus involved should be studied by a competent technical tribunal, whereby a decision may be reached, which, being based upon due consideration of all the conflicting issues involved, shall be acceptable to all our people, and therefore, permanent?

In the hope of promoting the creation of such a tribunal, in order to point out its necessity and its great possibilities for usefulness, and to insist in an understanding of the issues involved, this paper has been prepared. The writer ventures to hope that the study of the subject during many years and an extended experience as an engineer and manufacturer may have given him some qualifications for the task.

The argument herein advanced that a technical commission should be created to study and report upon the whole question of our weights and measures, its conclusions to form a foundation for action by the national legislature, is justified by the example and experience of other nations.

By an act passed July 28, 1866, congress provided that "it shall be lawful throughout the United States of America to employ the weights and measures of the metric system." Although it has thus been lawful, for more than forty years, for any one who so desires to use the metric system of weights and measures in the United States, the people have not seen fit to avail themselves of the permission, but, in their industry and commerce, have adhered, with absolute uniformity, to their established standards. The question which now exists, in view of the persistent agitation for the compulsory use of the metric system, is confined practically to a decision as to which of the following possibilities can most wisely be accepted, viz:

a The retention of our present system unchanged.

b The retention of our present system, modified and improved in its details.

c The adoption of the metric system.

As to the first and third of these possibilities opinions differ, but the choice between them can readily and intelligently be made by each individual if called on to decide, for the alternatives they present are definite and well known, although the far-reaching effects of the change involved in the third may not yet be understood or appreciated, but as to the second no intelligent decision can be reached until the changes which it implies have been formulated into a definite plan, and this can only be done properly by a competent commission or tribunal, qualified for the serious technical and scientific work involved. Before we discard our present system which, even if not perfect, has served us well, let us have a clear understanding of the improvements and corrections of which it may admit, so that we may contrast it in perfected form with the other system which it is proposed to substitute for it.

Such a commission, if created, should be authorized to include in the scope of its work all three of the possibilities above defined, in order that each may be duly considered and weighed, and that the report of the commission, when completed, shall cover the whole ground, and shall serve not only as a basis for final legislation by congress, but also, by its scope, thoroughness, and fairness, as a safe and competent basis for that public opinion which should underlie every statute, and without which no statute, even if enacted, permanently can endure.

Unquestionably there is a needless confusion in the English system of measures. We have, all told, ten tables of measures, nine of which are in active use.

In all of these, it would seem clear that something may be done in the way of simplifying the tables, discarding needless units, such as the furlong, rod, and rood, and reconstructing the scales to facilitate both binary and decimal subdivision.

No such changes, however, even where they do not affect the base of the system, should be adopted until, after exhaustive investigation, the effect of the proposed changes, on all industries and interests concerned, shall have been duly ascertained, nor until all interests which would be affected thereby have had due opportunity to submit their views and to explain the difficulties, if any, which they believe would arise from the proposed action. The issues thus involved are serious, numerous, complex, and highly technical. For their proper study, and for the selection of a new, or the development of an improved system which shall fully harmonize all difficulties and reasonably respect all interests, a commission is needed which should be composed of men of training, experience, and recognized authority in all of the many lines of industry, commerce, and science which are involved.

In considering the question of reconstructing our present system as to each of the several scales or "tables" of weights and measures, obviously the first step would consist in fixing the unit or base. This being determined, the next and final step would be to determine the multiples and submultiples of the base which may be convenient or necessary, and in determining these to aim to make available the system of binary notation for common use and a system of decimal notation for purposes of computation.

Absolute Units.

The early units of measurement were usually based on nature, as for example, the foot, the thumb, a grain of barley, etc. Each country or district fixed its own units. Commerce was restricted and chiefly local. Divergence in weights and measures was thus of little consequence at first, but became more serious as industry developed and as commerce broadened and became international. Hence arose suggestions for the fixing of local and national standards, and finally for the creation of standards which should become international. The underlying motive throughout was a growing perception of the importance of uniformity, in place of the endless diversity which prevailed.

Now, are the French, or metric units, better than ours, and if so, are they sufficiently better to justify the rejection of the latter in their favor? As to length. The meter has been found to be too long a unit for most industries, except the textile, in which it

[1]Abstract of a paper presented at the New York meeting, December, 1906, of The American Society of Mechanical Engineers.
[2]President of the Yale & Towne Mfg. Co.

and the inch both prevail. The millimeter is too short for ordinary measurements, and too long for fine ones; the inch and its decimal divisions are better, while in the building trades the foot is preferable to the meter. The kilometer is good, but not better than the mile, to which its ratio is 0.62137.

As to weight. The kilogram is about double the pound, and experience has proven that it is a less convenient unit than the latter. For the common uses of the people the French discard the kilogram, taking its half part, which they call a "livre," or pound, and which they then divide into halves and quarters. The gramme is equal to 15.432 grains and, with its subdivisions, probably a better unit than the grain. The tonne is practically identical with our ton of 2240 pounds, its ratio to the latter being 1.016.

As to volume. The liter is almost identical with our quart. Our larger unit, the gallon, is perhaps more convenient for many uses, but either is good. The hektoliter is equal to 2.8375 bushels and would seem to be too large, although its tenth part coincides closely with our peck.

As to area. The hectare is equal to 2.471 acres. As a unit this is too large and the acre is better.

Certainly this comparison fails to show any marked preponderance in favor of the metric units; if anything, it would rather prove the reverse.

It is conceded that in their inter-relations the metric units have a marked advantage, and constitute collectively a more scientific and logical series than exists in any other system. This fact, however, while of great interest to scientists and of great practical benefit in their work, does not interest the common people, has no bearing upon the transactions of their daily life, and does not constitute any just ground for attempting to force upon them new units which, for their uses, are less convenient than those they now have, especially if this change would carry with it little or no compensating gain.

This argument against a change in the basic units by no means implies, however, a corresponding objection to a revision of the scales or tables which embody the multiples and submultiples of the basic units. It is conceded that these tables, as they exist in the English system of weights and measures, are needlessly complex and numerous, and could easily be simplified, to their great improvement, without at all disturbing or changing any of the basic units. But this is a totally different proposition from a change in the basic units. It would involve no change in habits of thought, and little or no change in the mode of expressing the daily transactions of the people, whereas a change of units would be subversive of both and of all records and expression used in the current transactions of life as to everything in which our weights and measures are involved.

Between measures of length and measures of all other kinds there is an organic difference which it is of vital importance should fully be recognized in the consideration of the subject under discussion.

Measures of value, weight and capacity are used chiefly in commerce and the transactions of daily life, all of which are transient; but measures of length relate chiefly to applied science; that is, to organized industry, the transactions and results of which are not transient but more or less permanent. They exist, they are imperishable, and many of them never will nor can be changed so long as the things to which they apply shall endure. Among those thus referred to, may be specified the following:

All existing structures.

All existing machines.

All existing railroad equipment.

All existing interchangeable parts, such as screws, nuts, piping, shafting, couplings, etc.

All the existing vast equipment of special tools, gages, etc., of the metal-working industries.

All existing land areas and titles.

To change the monetary unit of a country involves some temporary inconvenience, but no permanent or serious disturbance. Transactions in money relate chiefly to the present, or to the immediate past. A change of this kind has successfully and easily been made, within the past century, by nearly all of the chief commercial nations.

To change the unit of weight would also involve some temporary inconvenience but nothing more, with the important exception of technical records and scientific work. Outside of these latter, transactions involving weight are matters chiefly of the present or of the immediate past. The same is true of the unit of volume or bulk.

But for us to change our unit of length would be to undermine the whole fabric of our vast mechanical industries, to disorganize our technical science, and to cause an actual destruction of values and of vested rights which would be colossal in its extent and almost infinite in its effects. The reasons for this are overwhelming; they are already abundantly on record, and will be referred to later. The variation in length of the British yard has been "scarcely more than a hundredth of an inch" in the last four hundred years.

Why should this revolutionary and destructive change be made? Who urges it? Not the interests chiefly and directly concerned, and which would have to foot the bill—the organized industries of the country—but theorists and scientists, sincere beyond doubt, but without practical experience in the matters chiefly involved, on whom none of the vast loss would fall. Possibly the ultimate benefit of the change which they urge might be so great and far reaching as to outweigh the enormous waste and loss which certainly would be entailed, but neither of the groups so aligned on opposite sides in this controversy is competent alone to weigh the evidence and to settle this question. Each is prejudiced, and their interests are opposed. Calm, thorough, and skillful investigation of the whole vast subject, by an impartial technical commission, is the only possible way by which to reach a decision which shall be sound and just to all interests, and which will stand the supreme test of experience and time.

Since 1866 the use of the metric system has been legal in the United States. Any manufacturer who so chose has been free to use it. With insignificant exceptions none have chosen to do so—they do not want it—and yet theorists and scientists, who find it useful in their work, would force its use on others who have neither the need nor the desire for it, and who believe that its enforced employment would be a vast and lasting injury to them. Legislation of this character would be paternalism run mad. Our laws should be made by the people, not for them. I repeat that legislation of such vast importance, and such far reaching effect, should be based on the most careful and competent expert investigation, and upon an unmistakable popular demand. No such demand exists.

The transition from our actual system to the metric basis, in measures of length, might have been comparatively easy one hundred years ago, when modern industry was just starting upon its marvelous career, but would be infinitely difficult now in view of the vast present development of that industry, nearly every implement of which is based upon our established unit of length.

To change the unit of length would be to substitute variety and confusion where now we have absolute uniformity throughout the Anglo-Saxon world. Whatever may be the plea of the scientists in this regard, that of the manufacturers may be summed up in four words, "Let us have peace." As is well said by Hallock and Wade, "it remains for the adherents of the metric system to convince the manufacturing public by demonstrating its (metric system) superiority for their work."

As pointed out before the transition from our present system to a new one would be relatively simple and easy as to measures of weight and volume, but not so as to measures of length and area. As to each there would be inevitably a period of confusion while the people were learning the names and beginning to learn the values of the new units, but in time they would acquire and use the new system. In matters involving measures of length, and of area however, a far greater obstacle would have to be overcome, namely the difficulty of effecting the transition from the old to the new basis. The old units would *exist* in every machine, in every structure, and in innumerable articles of daily use, and no matter how superior the new system might be to the old, the impossibility of immediately bringing the gulf between the two would remain.

What advantage in our domestic industry and trade could be expected from the substitution of the metric for our present system? As shown above, the metric units as a whole are no better than ours, and those relating to length and area are inferior. The law of 1866 legalized the use of the metric system, and those who prefer it are already at liberty to use it. What is there in the existing situation to justify further legislation intended to make the use of the metric system compulsory on the government as an entering wedge for the avowed purpose of ultimately forcing its use upon the people? A law so revolutionary in its character should only be enacted in response to a clear, if not an overwhelming, public demand. No evidence is adduced to show that any such demand exists.

If we should adopt the metric system our old units would persist for generations. This is the case in France, after one hundred years and in Germany after forty years, although in these cases the change was made when modern industry was in its infancy or comparatively undeveloped. People think in their units of measurement and cannot translate mentally into strange units, especially in the transactions of daily life.

It is urged, as a chief argument in favor of the metric system, that it would promote our export trade. If true, this is an important factor which should have due weight, but is it true? For reply we can only look to experience. What does this teach? Has non-use of the metric system retarded the growth of our exports of manufactures? In 1895 they were $40,000,000 or 12.76 per cent of total exports; in 1905 they were $543,000,000 or 36.44 per cent of total exports. During this period of ten years our exports of manufactures increased thirteenfold, and their percentage of our total exports increased threefold. Would these increments have been greater or more startling had we adopted the metric system?

Has the non-use of English measures by France, Germany and other metric countries operated to decrease our imports of manufactures from such countries? If they should abandon the metric system tomorrow, and substitute for it the British-American system, would our purchases of their manufactures thereby be increased?

As a matter of fact there is no recognized or visible demand from our export merchants, or from the foreign merchants to whom they sell, that we should discard our present system of weights and measures and adopt the metric system.

The figures show clearly the preponderance of value to the United States of our export trade to Great Britain and her colonies over that to all other countries of the world, and the British markets are usually superior to others for manufacturers of the medium and higher grade, in which we chiefly excel. China is our best customer for textiles, and in 1905 bought them to the value of $33,849,717.

The writer, speaking from personal experience in the export of certain American products to all parts of the world, can state that during more than thirty years of such experience no instance has occurred in which our use of English units has interfered in the slightest degree with such business, nor in which any demand has been made for the employment in such business of the metric system. It is his conviction that our adoption of the metric system would not perceptibly increase our exports to metric countries and that it would handicap our export trade to other countries which offer us the largest markets. So long as England maintains her present standards we would need to maintain our existing units of measurement, wholly or in part, for all goods made for British markets, which as shown in the foregoing table, constitute 49 per cent of the total. This would intensify and prolong the persistence of our old units, and would retard immensely the acceptance and use of the metric units. The result would be little or no gain to our export trade to metric countries, some damage to our trade in British countries, and a great increase of confusion from the loss of that perfect uniformity which now prevails in our weights and measures. Surely in this respect, also, the findings of a competent commission, based on a thorough investigation of all the many branches of industry and commerce which are concerned, should precede any alteration of our present system of weights and measures.

OFFER EMPLOYES STOCK.

Officers and employes of the United States Steel Corporation have received a circular announcement of the plan for subscribing to preferred stock of the corporation, in accordance with its usual practice. The right is given to subscribe at $102 per share, to the aggregate of 25,000 shares. The circular differs from those previously issued in only one important regard, the new feature being described in the following paragraph:

"If before Jan. 1, 1912, while in the employ of the corporation, or of one or another of its subsidiary companies, the subscriber dies or becomes totally and permanently disabled, his estate or he, if so disabled, shall also receive a pro rata amount of the special fund arising from forfeitures referred to in the original circular letter, dated Dec. 31, 1902, which may have accrued at the time of his death or disability."

SWEDISH IRON TRADE.

The production of Swedish iron and steel during the first nine months of 1906 compares as follows with the same period of the previous year, in tons:

	1906.		1905.
Pig-iron	449,000	against	393,600
Blooms	131,200	"	132,300
Bessemer ingots	163,200	"	132,300
Open-hearth ingots	224,600	"	208,000

The number of blast furnaces in blast has been 105 in 1906, against 92 in 1905; Bessemer furnaces 20, against 17; open-hearth furnaces 50, against 46 in the previous year. The export of iron and steel amounted during the same nine months to 275,100 tons, against 266,800 tons in 1905, composed as follows:

	1906.	1905.
Pig and ballast iron	73,400	75,000
Scrap	7,700	6,500
Ingots and blooms	28,400	29,900
Bar iron	139,100	134,100
Cut iron bars	4,200	2,800
Rolled and drawn wire	6,800	5,200
Plates	2,200	1,900
Pipes and strips	9,200	7,800
Nails	4,100	3,600
Total	275,100	266,800

Large new iron works are it is reported, about to be established at Paruschowitz, Upper Silesia.—*Iron and Coal Trades Review.*

THE ART OF CUTTING METALS[1]

(Continued from last week.)

By Fred W. Taylor.

FORGING AND GRINDING TOOLS.

Relative Work to Be Done in the Smith Shop and on the Grinding Machine for Maximum Economy in Making Tools.

It requires much and careful observation, made not in a desultory manner with which the shape of the nose of the tool should be forged; in other words, to determine how much of the work of shaping the nose of the tool should be done by the smith and how much should be left for the grinder. It is evident that this will depend upon the method and the facilities in the machine shop for rapid and accurate grinding. If the grinding is done by hand, and on a grindstone or on a fine emery wheel it will take a far longer time and be much more expensive than if done on an automatic grinding machine which is supplied with a corundum wheel, the size of the grit of which is carefully selected, so as to grind with the greatest rapidity while at the same time leaving a sufficiently smooth finish. The better and more rapid the grinding facilities then, the smaller should be the percentage of work done in shaping the tool in the smith shop and the larger the percentage done by the grinder, and vice versa.

Limit Gage for Dressing Tools.

In Fig. 61, is shown a gage giving the forging limits which have been demonstrated to be most economical in forging a tool of the size shown in Fig. 62, in shops in which first-class automatic tool grinders are used. In shops in which tools are ground by hand on an emery wheel or grindstone, it will be found economical for the smith to shape the curve of the cutting edge of the tool within much closer limits than those given in this gage.

This limit gage is placed with its parallel shank on top of the body of the tool, while the curved slot is directly over the curved nose of the cutting edge, hence in dressing the tool, and in approximating the curve of the cutting edge, all that is required of the smith is that every portion of the outline of the cutting edge of the tool shall come within the limits of the curved slot. On looking down through the slot in the gage, the smith should see the whole outline of the cutting edge of the tool, and provided the whole line of the cutting edge as left by the smith is in sight through this slot, it is of no consequence whether the curve is irregular and jagged in shape or whether it is left smooth. It will be cheaper for the grinder to grind off the irregularities in the curve than for the smith to take the extra time required for this purpose. Each type of tool used in the machine shop should be carefully studied in this way so as to establish the most economical limits within which the smith is to do his work, and directly at the spot where the emery wheel or grindstone is doing its work. The practice of pouring water upon an emery wheel above the tool and allowing the stone to carry the water along with it is to be avoided, as this method provides entirely too small an amount of water to properly cool the tool. We have found by experiment that it requires a stream of water of not less than five gallons per minute, thrown directly upon the cutting edge of the tool, to prevent its being overheated on the grindstone. Even then

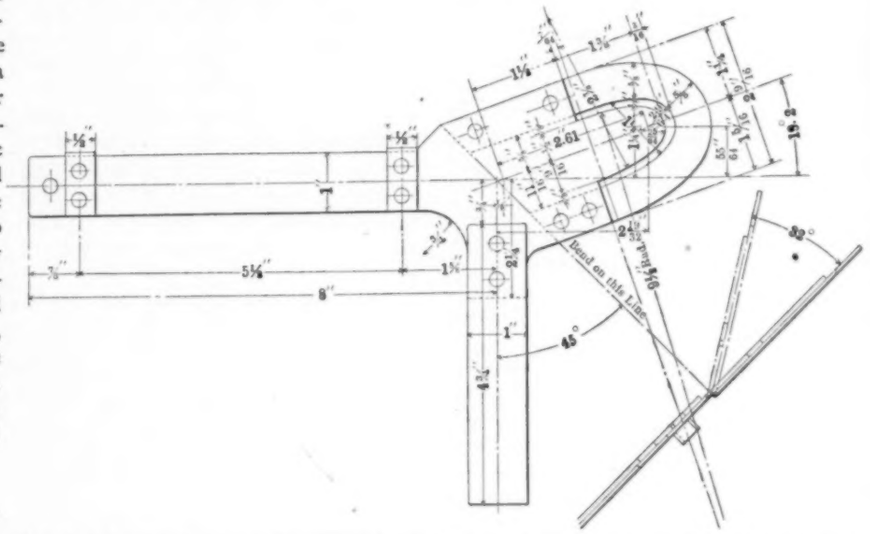


Fig. 61.—Limit Gage for Forging 1-Inch Round Nose Roughing Tool Shown in Figs. 22 to 26.

limit gages similar to the one illustrated in Fig. 61, should in all cases be carefully made. The writer wishes to emphasize again the desirability of so designing tools and, particularly, of so adjusting the relative amount of work to be done by the grinder and the smith, that all sizes up to 1 x 1½ inch may be dressed in two heats, and still leave as little work as practicable for the grinder.

Importance of Using a Heavy Stream of Water Directly on Nose of Tool in Grinding Tools.

In a later paragraph attention is called to the great injury which is constantly being done to the modern high speed tools by heating the cutting edge too hot on the grindstone. It becomes of the first importance in grinding, whether an automatic tool grinder is used or whether tools are ground by hand, always to throw a heavy stream of water upon the nose the man running the grinder should be under frequent supervision or the temptation to force the grinding, to hurry his work and thus to overheat the tool, may prove too great. The water should be thrown in a large stream with slow velocity to avoid splashing.

The necessity for not overheating the tool in grinding also modifies the shape for forging our standard tool. It will be noted that the noses of our standard tools as they come from the smith shop, shown in Figs. 58 and 59,[2] have clearance angles of 20 degrees, whereas a clearance angle of 6 degrees is ample for shop use. In other words, the noses of our standard tools lean far forward out of the perpendicular. The object of this is to make the distance beneath the cutting edge which must be ground off of the flank each time the tool is sharpened as

[1]Presidential address, A. S. M. E., 1906.

[2]Iron Trade Review, Feb. 7, 1906.

short as possible. In this way a smaller pressure between the tool and the grindstone is called for, the tool is ground in a much shorter time, less heat is generated by the grindstone, and there is less danger of injuring the tool from overheating.

By noting also tool shown in Figs. 57 and 58, it will be seen that the nose when cut off by the blacksmith has a much more acute lip angle than is actually needed in the machine shop for cutting. This acute angle is given the tool for the same reason as was the extra clearance angle, namely, to diminish the extent of the surface which must be ground from the lip surface of the tool. The diminution in the grinding which results from leaning the nose of the tool forward and cutting a much steeper side slope in the smith shop becomes apparent from a comparison of Fig. 58, with the view of a tool dressed and ground in the ordinary way, as shown in Figs. 45, 46 and 47.[3]

In the drawing shown, Figs. 22-26,[4] it will be noted in each case that broken lines above and beyond the upper part of the nose of the tool indicate the shape to which the tool is forged, while the solid, heavy lines indicate the shape to which the tool is ground at its first grinding.

Our reason for leaving so much metal in the forged tool to be ground off is that sometimes in giving the tool the high heat, owing to too slow a fire being used, the metal close to the surface of the nose of the tool is somewhat injured, and by grinding off this exposed point of the tool at its first grinding, a tool which runs at once at its highest cutting speed can be obtained.

Tools With Keen Lip Angles More Expensive to Grind Than Those With Blunt Lip Angles.

While on the subject of grinding, it should be pointed out that the steeper the side slope of the lip surface, the larger becomes the area of the surface which must be ground and the smaller the number of times a tool of a given height can be ground before redressing. This will be clearly seen by inspecting Figs. 20, 16 and 17;[5] in one of which successive layers of 1-32 of an inch of metal are to ground off with a side slope of 14 degrees or at right angles to the vertical line, while in the other a side slope of 22 degrees is used in grinding.

A steep side slope also renders the cutting edge more likely to be overheated in grinding as it leaves a smaller cross-section of metal in the wedge-shaped section close to the cutting edge for carrying away the heat.

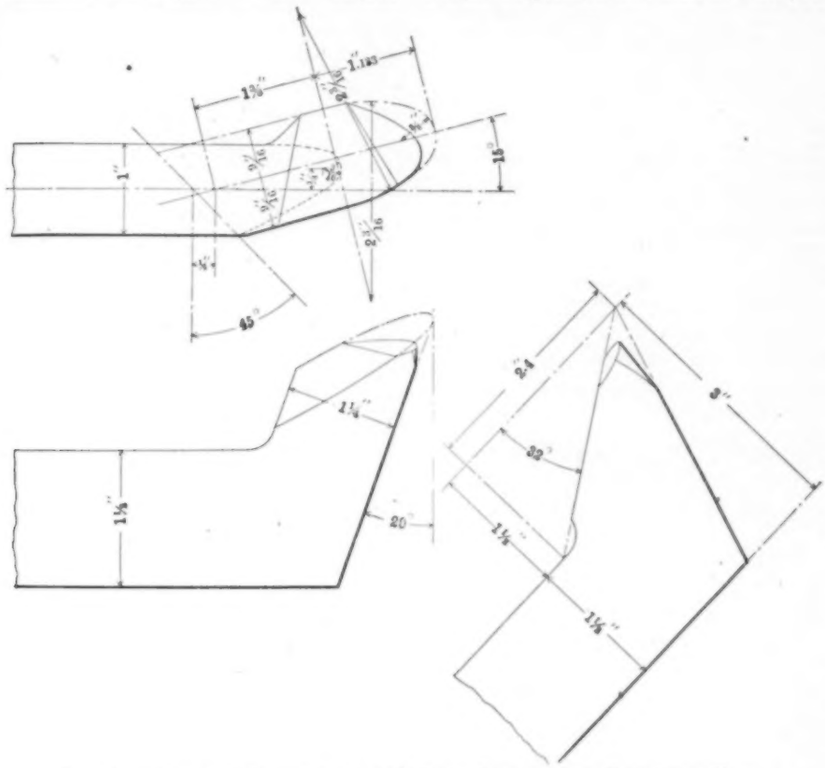


FIG. 62.—DETAILED DIMENSIONS OF 1-INCH ROUND NOSE ROUGHING TOOL.
Forged outline shown by broken lines; solid outline shows tool ground to standard blunt angles; clearance six degrees, back slope eight degrees, side slope 14 degrees.

If economy of grinding alone then were to be considered, a steep side slope in the tool would be avoided for every reason. A consideration of the above facts will also make it more clear why all machinists who grind their own tools incline toward too little rather than too much side slope.

Flat Surfaces Tend to Heat the Tools in Grinding.

Flat surfaces coming into contact with the emery wheel also tend very greatly to heat the tool, chiefly because the surface which is being worked upon is soon ground so as to fit so exactly and closely against the outside surface of the grindstone that no water can find its way between the stone and the tool and thus cool the latter. It is for the purpose of giving the water free access to the face of the tool being ground that in grinding tools by hand the best grinders invariably keep the tool more or less wobbling about the face of the grindstone while the greater part of the metal is being roughed off. For the same reason they hold the tool stationary against the stone only during the last stage of the grinding when finishing the lip surface to the exact angle required. In selecting an automatic grinder, no machine should be purchased which does not permit free access to the water to the flat surface of the tool during the operation of grinding.

It is for a similar reason also that tools with a curved cutting edge are to be preferred from the standpoint of grinding to those with a straight line on the cutting edge. The straight line always implies a flat clearance surface beneath the cutting edge for grinding, and a flat surface is far more difficult to grind without heating than a curved surface.

The Selection of the Emery Wheel.

The selection of the proper emery wheel for tool grinding is also a matter of great importance. The hardest grit obtainable should be used, and for grinding ordinary shop tools, so far as we know, corundum is the best. Rapid grinding is promoted by the use of a coarse grit in the wheel. On the other hand, too coarse grit leaves an irregular outline at the cutting edge of the tool. After experimenting with emery wheels varying greatly in their coarseness, we have adopted as our standard an emery wheel having a mixture of grits known as size No. 24 and size No. 30. A corundum wheel made of these two sizes of grit grinds

[3] IRON TRADE REVIEW, Feb. 7, 1907.
[4] IRON TRADE REVIEW, Jan. 24, 1907.
[5] IRON TRADE REVIEW, Jan. 24, 1907.

fast and leaves a sufficiently smooth finish on the tool.

Desirable Features in an Automatic Tool Grinding Machine.

Tools should never be ground by fastening them solidly in a slide or tool rest which is fed directly against the emery wheel with a screw; since soon after the grinding starts, the surface of the tool is made to fit exactly against the surface of the stone after which grinding is exceedingly slow and the tool is rapidly overheated. It may almost be said that the moment a tool becomes a close fit against the side of the grindstone, grinding ceases and heating begins.

Much more rapid grinding can be done upon a grinding machine in which there is provided a means for automatically adjusting the pressure of the tool against the emery wheel. Each sized tool should have adapted to it a pressure which is automatic and which is just sufficient to grind rapidly without danger of overheating. An automatic machine of this type will do about twice the work of a machine in which the presure between the tool and the emery wheel is regulated according to the judgment of the grinder.

WHERE EXPERIMENTS WERE MADE	PRESSURE OF CHIP ON TOOL IN TONS (2000 LBS.) PER SQUARE INCH OF SECTION OF CHIP IN CUTTING			PRESSURE REQUIRED TO FEED THE TOOL CUTTING STEEL	PRESSURE OUTWARD, FORCING TOOL HORIZONTALLY AWAY FROM THE WORK	EFFECT OF CUTTING SPEED UPON PRESSURE OF CHIP ON TOOL
	CAST IRON	WROUGHT IRON	STEEL	PER CENT	PER CENT	
MANCHESTER, ENG. BY DR. NICOLSON	53 to 94		121 to 168	0 % to 20 %* of pressure of chip on tool	18% to 78% of pressure of chip on tool	Pressure on tool diminishes slightly as speed increases
GERMAN EXPERIMENTS SUMMARIZED BY MR. HERMAN FISCHER	50 to 85	78 to 120	113 to 170	Equal to pressure of chip on tool		
AMERICAN EXPERIMENTS MADE BY THOSE CONDUCTING THE EXPERIMENTS DESCRIBED IN THIS PAPER	35 to 99		120 to 148	Equal to pressure of chip on tool		No appreciable difference noted in extensive series of experiments when speed was doubled; but machine cuts taken at high speeds consume less power per pound of metal removed than at slow speed, owing to the diminution of friction

*Designers of machine tools are warned not to use this figure in designing gearing, etc., for feeding the tool

TABLE 63.—SUMMARY OF PRESSURE OF CHIP ON TOOL AND OF FEEDING PRESSURE, ETC. English, German and American experiments.

Desirability of a Large Supply of Tools, a Complete Tool Room, and an Automatic Grinding Machine.

We have pointed out that the greatest gain from a study of the art of cutting metals can be attained only through reorganizing the system of management of the shop in such a way that it is possible to assign daily tasks to the workmen, and that in preparing for this a thorough system must be established for delivering to each workman an ample supply of tools ground to standard shapes ready for use. This involves a tool room with ample storage space for a large number of extra tools. For economy, even in a small shop, the tools should be ground in lots or batches; i. e., there should be such an ample supply of tools in the shop that dull tools of a given size and shape can be allowed to accumulate until a lot, say, ten to twenty or more, is ready for the grinder. With this system it is economical for the small shop as well as the large one to use an automatic tool grinder.

In our experience in reorganizing the management of machine shops we almost invariably have difficulty in persuading the owners to maintain the large supply of tools which is needed to get the full benefit from the task system. It seems desirable, therefore, to lay particular stress upon all of the elements connected with the tool supply—of which accurate and rapid grinding without injuring the tool is the most important.

We would call attention to the fact that there is little if any economy in the use of an automatic tool grinding machine unless standard shapes for all tools have been adopted, and unless a large supply of tools is kept in a well-equipped tool room, from which they are issued to the men, no workman being allowed to grind his own tools.

PRESSURE OF THE CHIP ON THE TOOL.

The subject of the pressure of the chip upon the tool will now be dealt with at length, even although in most of its aspects an investigation leads to negative or more or less contradictory results. Indeed, our principal object in writing at such length upon this subject has been to endeavor to make it clear that, on the whole, a study of this element in the art of cutting metals is comparatively barren of practical results. It is our hope, therefore, that we may convince our readers that a study of the pressure of the

TABLE 64.—PRESSURE ON TOOL IN CUTTING STEEL FORGINGS AND CASTINGS.

Table shows that no direct proportion exists between the cutting speed and the pressure on the tool; between the cutting speed and the crushing or tensile strength of the steel; between the pressure on the tool and the crushing or tensile strength. The most important data will be found in the five columns with heavy faced type.

WHERE EXPERIMENTS WERE MADE	KIND OF MATERIAL CUT BY THE TOOL	KIND OF TOOLS USED	AIMED AT		ACTUAL SECTIONAL AREA OF CHIP IN SQUARE INCHES	CUTTING SPEED IN FEET PER MINUTE USING STANDARD ROUND NOSED TOOL WITH $\frac{1}{4}$" DEPTH OF CUT AND $\frac{1}{16}$" FEED	PRESSURE OF CHIP ON TOOL IN TONS (2000 LBS.) PER SQ. INCH SECTIONAL AREA OF CUT	PHYSICAL TESTS OF THE METALS EXPERIMENTED UPON		CHEMICAL COMPOSITION OF METALS EXPERIMENTED UPON		
			DEPTH OF CUT IN INCHES	FEED IN INS.				TENSILE STRENGTH IN TONS (2000 LBS) PER SQUARE INCH	PERCENTAGE OF STRETCH	TOTAL CARBON	SILICON	MANGANESE
MANCHESTER, ENG. IN 1903	SOFT STEEL FORGING	MISCELLANEOUS MODERN ENGLISH HIGH SPEED CHROMIUM-TUNGSTEN OR MOLYBDENUM TOOLS HEATED TO MELTING POINT	$\frac{1}{4}$	$\frac{1}{16}$		111	128	30	29	0.20	0.058	0.605
	MEDIUM STEEL FORGING		$\frac{1}{4}$	$\frac{1}{16}$		80	121	32	28	0.28	0.086	0.650
	HARD STEEL FORGING		$\frac{1}{4}$	$\frac{1}{16}$		41	168	52	14	0.51	0.111	0.792
WM. SELLERS & CO. PHILADELPHIA, PA. IN 1902	MEDIUM STEEL (ANNEALED) FORGING	HIGH SPEED CHROMIUM-TUNGSTEN TOOL HEATED TO MELTING POINT	$\frac{1}{4}$	$\frac{1}{16}$		64	136	35	30	0.34	0.103	0.600
WM. SELLERS & CO. PHILADELPHIA, PA. IN 1883	HARD STEEL BOLT	Carbon tempered tools were used in these experiments, but the cutting speeds given are those corresponding to modern high speed Chromium-Tungsten Steels heated to melting point and using a depth of cut of $\frac{1}{4}$" and feed $\frac{1}{16}$" of quality of tool No. 20 Folder 20, Table 138, of standard $\frac{3}{4}$" size.	1 straight edge tool	0.05	0.05	35	128	51	8	0.55		
	STEEL FORGING		2 straight edge tool	0.02	0.0512	45	132	43	14	0.75		
	HARD STEEL CAR WHEEL CASTING					22	92	48*	3*	0.82		

*Estimated

chip on the tool leads to few useful conclusions so far as the vital question of cutting speeds is concerned.

This element has been the subject throughout the world of perhaps four-fifth of all the experiments connected with the art. And yet we believe that our contention that greater progress would have been made if no experiments whatever had been undertaken in this particular field is thoroughly borne out. The chaotic results obtained through these pressure experiments have unquestionably held back further scientific research in the whole art, and led experimenters to the conclusion that after all this subject belongs to the domain of "rule of thumb" rather than to that of exact science.

Summary of Conclusions of English, German and American Experimenters.

The accompanying table (63) gives the broad conclusions arrived at by experimenters in Germany, England, and this country, respectively, as to the pressure of the chip upon the tool in cutting steel and cast iron. The figures from the German experiments are taken from an article by Herman Fischer (published in *Zeitschrift des Vereines Deutscher Ingenieure*, May 1, 1897), who, after reviewing various German experiments made from time to time and considering their reliability, states that, according to the hardness of the material, the shape of the cutting edge of the tool, including the clearance and lip angles and its dullness within permissible limits, and the relation between the length and thickness of the chip, which is being cut, the pressure per square inch of section of the chip varies between the limits given in the table. He also recommends that in designing machine tools, the higher figures for the cutting pressures be counted upon.

Dr. Nicolson in summarizing the Manchester experiments and his own experiments made later with his highly perfected apparatus, has concluded that the pressure on the tool is directly proportional to the sectional area of the cut, that is, of the layer of metal being removed by the tool He concludes that the pressure for the same total area is the same whether the thickness of the chip be fine or coarse. This is not in agreement either with the German experiments or our own, as the latter show increasing pressures as the thickness of the chip diminishes, particularly in the case of cutting cast iron.

It must be noted, however, that in the Manchester experiments 1-16 of an inch was the finest feed taken whereas our experiments indicate a greater proportional increase in pressure as the feeds become finer than 1-16 of an inch. Our experiments indicate that the pressures vary between the limits given in the table summarizing the English, German and American experiments. In the case of steel they slightly increase as the thickness of the shaving diminishes; and in the case of cast iron very materially increase as the thickness of the shaving diminishes.

As to the effect of cutting speed upon the pressure of the chip, the conclusions from the Manchester experiments and from our own are that there is but slight difference in pressure between fast and slow cutting speeds, but that the total power required to remove a given amount of metal is less at fast than at slow cutting speeds, owing chiefly to the diminution in the frictional resistance of the machine tool and its drive at higher speeds.

Dr. Nicolson's experiments indicate that the outward or "surfacing" pressure upon tools or the pressure tending to push the tool away at right angles to the axis of the work varies according to the contour of the cutting edge and the lip and clearance angles of such tools as are in common use between the limits of 18 per cent and 90 per cent of the vertical pressure upon the tool, while the feed or "traversing" pressure upon similar tools varies between zero and 20 per cent of the vertical pressure.

In measuring the outward and feeding pressures Dr. Nicolson has designed much the most scientific apparatus which has yet been made. Nevertheless, engineers must be warned not to use the feeding pressure obtained by him in designing machine tools, as both the German and our own experiments indicate that at times the feeding pressure is equal to the entire downward pressure on the tool. Doubtless Dr. Nicolson would have arrived at the same conclusion had he made more experiments, and particularly with tools which are too dull for proper shop use. This degree of dullness, however, will occur on every machine tool sooner or later, and the pressure corresponding to it must, therefore, be the limiting figure used in designing feed gearing, as otherwise the feed gears will be broken.

In 1883 in the works of Wm. Sellers & Co., of Philadelphia, a series of experiments was made by Messrs. Wilfred Lewis and John Bancroft with a dynamometer, in which the pressure of the chip upon the lip surface of the tool was measured. These experiments showed that for steels varying greatly in hardness and consequently in their cutting speeds, the variation in the pressure of the chip upon the tool in no way corresponded either to the hardness of the steel or to the speed at which it could be cut. A further study of the results of these experiments indicated also that there was no

TABLE 65.—PRESSURE ON TOOL IN CUTTING CAST IRON.

Table shows that no direct proportion exists between the cutting speed and the pressure on the tool; between the cutting speed and the crushing or tensile strength of the cast iron; between the pressure on the tool and the tensile strength. For shape of tool used in William Sellers & Co. experiments see Figs. 20 and 21. The most important data will be found in the four columns with heavy faced type.

WHERE EXPERIMENTS WERE MADE	KIND OF MATERIAL CUT BY THE TOOL	KIND OF TOOL USED	AIMED AT: DEPTH OF CUT IN INCHES	AIMED AT: FEED IN INCHES	ACTUAL SECTIONAL AREA OF CHIP IN SQUARE INCHES	CUTTING SPEED IN FEET PER MINUTE FOR A CUT 1/8" DEEP 1/8" FEED	PRESSURE OF CHIP ON TOOL IN TONS (2000 LBS) PER SQ. INCH SECTIONAL AREA OF CUT	PHYSICAL TESTS OF THE METALS EXPERIMENTED UPON: TENSILE STRENGTH IN TONS (2000 LBS) PER SQ. IN.	PHYSICAL TESTS OF THE METALS EXPERIMENTED UPON: CRUSHING STRENGTH IN TONS (2000 LBS) PER SQ. IN.	CHEMICAL COMPOSITION OF METALS EXPERIMENTED UPON: TOTAL CARBON	CHEMICAL COMPOSITION OF METALS EXPERIMENTED UPON: COMBINED CARBON	CHEMICAL COMPOSITION OF METALS EXPERIMENTED UPON: GRAPHITE	CHEMICAL COMPOSITION OF METALS EXPERIMENTED UPON: SILICON	CHEMICAL COMPOSITION OF METALS EXPERIMENTED UPON: MANGANESE
MANCHESTER, ENG. IN 1900	SOFT CAST IRON	MISCELLANEOUS MODERN ENGLISH HIGH SPEED CHROMIUM-TUNGSTEN OR MOLYBDENUM TOOLS HEATED TO MELTING POINT	1/8	1/8	0.0124	100	53	6.35	30	3.062	0.420	2.660	3.010	1.100
	MEDIUM CAST IRON		1/8	1/8	0.0115	49	94	12.50	49	3.305	0.665	2.720	1.760	0.600
	HARD CAST IRON		1/8	1/8	0.01173	32	92	8.92	47	3.055	1.150	1.975	1.760	0.940
WM. SELLERS & CO. PHILADELPHIA, PA. IN 1902	SOFT CAST IRON BELOW THE OUTSIDE SCALE ROLL 13" DIA. CAST SOLID	HIGH SPEED CHROMIUM-TUNGSTEN HEATED TO MELTING POINT COMPOSITION OF THESE TOOLS TOOL NO. 76 FOLDER 20, TABLE 138 OF STANDARD 3/4" SIZE	1/8	1/8		148	52						1.26	
	SAME BAR OF CAST IRON. CUTTING THE SCALE		1/8	1/8		78	52						1.34	
	HARD CAST IRON 13" DIA. CONTAINING 15% STEEL SCRAP CAST 2" THICK HOLLOW CENTER		1/8	1/8		45	80	12.00					1.19	

clearly defined and traceable relation between the tensile strength or the crushing strength of steel and the cutting speed. These results agreed accurately with the observations, which we had made in our many experiments on cutting speeds, namely, that lathes, boring mills, etc., are able to pull about as heavy cuts with hard as with the soft steels, athough there is a very great difference between the cutting speeds of hard and soft steels. Having established this important fact to our satisfaction and having through these experiments obtained sufficient data for properly designing machine tools as to the power required to cut metals, no further experiments were made by us in this line until the year 1902, when the subject was again more carefully investigated through dynamometer experiments in the shop of Wm. Sellers & Co. These experiments will be described later in this paper.

In the Manchester experiments the pressures of the chip upon the tool were carefully recorded and averaged, and the metals experimented upon were chemically analyzed and test bars broken to determine their physical properties. A summary of these experiments in cutting steel forgings, as they bear upon the relation of cutting speed to pressure on the tool and to the tensile and crushing strength of the metals being cut, has been tabulated in the first table (64) above, together with our own experiments on the same subject, and in the second (65), are tabulated corresponding experiments made in cutting cast iron bars of varying hardness.

In the five columns side by side, will be noted in heavy-faced type the more important elements which should be studied in their relations one to another, namely:

a The cutting speed in feet per minute.

b Pressure of chip on the tool in tons (2,000 pounds) per square inch of sectional area of the shaving.

c Tensile strength in tons (2,000 pounds) per square inch.

d Percentage of stretch in test bars.

e Crushing strength in tons (2,000 pounds) per square inch.

Cutting Speed and Pressures of Chip on the Tool Compared for Steel.

Referring to table 64, on "Pressure on Tool in Cutting Steel Forgings and Castings," it is a matter of common knowledge that as the percentages of carbon and manganese increase in steel, the metal grows harder, and that corresponding to this increase of hardness, the cutting speed grows slower and slower. By looking in the carbon column and then in the cutting speed column of the table, the slowing down in the cutting speed corresponding in a general way to the increase in carbon will be apparent. On the other hand, when we compare the tensile strength in tons (2,000 pounds) with the cutting speed, we should expect here also to find that as the tensile strength of the steel increases, the cutting speed diminishes. This is, however, not the case, and a very marked and at first unaccountable irregularity exist between the tensile strength and the cutting speed. Although it may be said that in a very general way steels having higher tensile strength tend toward lower cutting speeds.

When we examine, however, the more important subject of the relation of the pressure on the tool to the cutting speed, it is astonishing to note that there is no traceable relation whatever between the two. For example, referring to line 1 of the table a preessure of 128 tons upon the tool is accompanied by a cutting speed of 111 feet per minute, while on line 5 a pressure of 128 tons has a cutting speed of only 35 feet per minute, while again on line 5 a pressure of 128 tons has a cutting speed of only 35 feet per minute, while again on line 2, 121 tons pressure on the tool has only 80 feet cutting speed. To a considerable extent also, there is the same lack of agreement between the tensile strength of the steel and the pressure of the chip on the tool. For example, on line 3 a tensile strength of 52 tons is accompanied by a pressure on the tool of 168 tons while on line 7 a tensile strength of 48 tons has a pressure of only 92 tons.

These statistics leave the student of this subject in a most chaotic state of mind, and of the many anomalies and surprises met with by experimenters in the art of cutting metals, the most baffling and apparently unaccountable are the following facts:

No law can be established or formulated for cutting steel which expresses either the relation between cutting speed and the pressure on the tool or the relation between cutting speed and the tensile and crushing strength of the metal to be cut.

(To be Continued.)

Heavy orders are now on the books of the St. Louis Car Co., which is having trouble keeping up with its contracts. Rio Janeiro and Buenos Ayres are large buyers of street cars.

BOOK REVIEW.

"The Engineering Index," edited by Henry Harrison Suplee, J. H Cuntz and Charles Buxton Going. New York. *The Engineering Magazine.* 7 x 9½ inches. 1,234 pages. Cloth. Supplied by THE IRON TRADE REVIEW for $7.50.

This volume is a continuation of the work of indexing current engineering literature begun under the editorship of Prof. J. B. Johnson and taken over by *The Engineering Magazine* in 1895. Volume IV indexes the important matter which has appeared in the leading technical journals of the world from 1901 to 1905 inclusive. These comprise about 250 technical and engineering journals in six different languages, about one-fourth of the periodicals being in languages other than English. A brief abstract is given of each article, showing its scope and purport, together with the author and number of words. The classification used in the volume is substantially that introduced in the previous volume, and cross references entries have been liberally made. The articles are indexed alphabetically under general catch words which indicate the general subject matter of an article. Sub-headings further subdivide the subject matter of the index, making it comparatively easy to obtain a list of the articles printed on any given suoject. The users of the index may be divided into two classes, namely, those who are looking for a definite item or article and who have a fairly clear idea of its subject and scope, and those who are investigating a certain subject and desire to be informed upon all the articles pertaining to that subject. To persons of these two classes the book will prove invaluable.

Strikes in Germany.—Strikes in Germany increased steadily during the first three quarters of 1906, amounting to 247 in the first, 655 in the second, and 778 in the third quarter, according to Consul-General Richard Guenther. Of the strikes in the third quarter 140 were successful, 364 partially so, and 278 failed. During the three quarters 3,515 establishments were affected by strikes, and 816 of these were obliged to close. The total number of striking workmen was 162,744. Lockouts were resorted to by 647 establishments, and 133 were closed. Of the 76 lockouts during the third quarter 16 were successful, 48 partially so, and 12 failed.

The alternate stack of the Marting Iron & Steel Co., at Ironton, O., which was in blast during January, had to be banked for six days owing to the Ohio river flood, which submerged the railroad tracks, cutting off the coke supply.

FAMOUS INVENTORS

Will be Honored by the Place of Their Birth.—News From New England Industries.

(Special Correspondence.)

Worcester, Mass., Feb. 10.—Spencer, Mass., the home place of Howe, the inventor of the sewing machine, is to erect a monument to the memory of its three famous inventors, Elias Howe, William Howe and Tyler Howe. The monument will consist of a granite shaft with medallions of the three Howes.

Clifton S. Marshall, general manager of the Worcester works of the American Steel & Wire Co., was guest of honor at the annual banquet of the Mutual Relief Association of the south works of the company held last week. In his remarks Mr. Marshall explained his full appreciation of the diversified good work done and being done by the association, as he, himself, before being promoted to his present position, had carried the dinner pail for fourteen years. Numerous relief associations of this nature are located in Worcester.

Victor E. Edwards, mechanical engineer for the Morgan Construction Co., Worcester, addressed seventy-two Fitchburg members of the Worcester branch of the National Metal Trades Association, the night of Feb. 2. Subject, "The Development of the Rolling Mill." The Fitchburg members will be entertained at dinner in Worcester by the Worcester branch members, on the night of Feb. 14.

The Marlboro Electric Machine & Lamp Co., Marlboro, Mass., is opening a large factory in Central Falls, R. I. It, in common with all other manufacturing concerns, is having trouble getting help. The state of Massachusetts has taken a hand in the help problem, and is operating a free employment bureau in Boston, where the unemployed, in any branch, may register free and better his chance of getting into the right place; and the prospects are the scheme will soon be extended into other large help employing centers of the state.

There is much talk among Worcester business men that in the comparatively near future a steel wire mill will be erected in the southern part of the city, costing from $2,000,000 to $3,000,000. It would be a competitor of the American Steel & Wire Co. The matter has not yet assumed definite shape. Harry W. Goddard is a leader of the enterprise.

The Wyman & Gordon Co., Worcester, Mass., maker of drop forgings, now employs about 125 men. Next week it starts a night shift, which will give it a run of 20 hours out of the 24. Owing to the great difficulty of getting skillful help, it will break in common help, mingling half and half among experienced men.

The largest factory telephone switchboard in New England is being installed by the Browne & Sharpe Mfg. Co., Providence, R. I. The new board is a 200 drop multiple, and offers opportunity for three operators to work. There are 5,000 solid connections on the board. The new board is replacing a 100-drop board installed four years ago. The company now has about 100 telephones located in different parts of the factory, which number will very soon be increased to 125.

Gilbert J. Rugg died suddenly in his home city, Worcester, Feb. 6, in his seventy-first year. Mr. Rugg was a practical machinist, and in 1864 he, with L. B. Witherby and S. M. Richardson, formed the partnership of Witherby, Rugg & Richardson. This concern did a successful business making wood-working machinery in Worcester until 1903 when it was consolidated with the Hobbs Mfg. Co. Mr. Rugg had been a public spirited citizen, holding many elective positions of prominence.

The Harris Palatial Car Co., New York, has bought a controlling interest in the T. H. Buckley Car Mfg. Co., Worcester. The Harris company has engaged as its mechanical engineer, B. E. Delle, formerly with the American Car & Foundry Co. Cars with steel underframes will be one of the Buckley company's specialties.

James A. Fullller, Worcester, passed his 83rd birthday working at his trade of machinist. Up to five years ago Mr. Fuller owned a machine business in Worcester.

Edmund Lyman Wood, eighty-four, died at his home in Hartford, Conn., Feb. 3. Mr. Wood learned the molding trade in early life. Besides working for other foundries, he ran a foundry of his own in Palmer, Mass. During the Civil war he worked casting shot and shell for the troops at the front.

Jan. 31, the real estate and machinery of the James Brown Machine Co., Pawtucket, R. I., were sold at auction. The total sale price was $113,650.

The Chicago & Northwestern Railway Co. has announced a new stock issue of $12,333,982 common stock and $5,598,780 preferred, to provide funds for "constructive, improvement and equipment" work.

DEATH OF HENRY C. SERGEANT.

Henry Clark Sergeant, of the Ingersoll-Sergeant Co., now an integral part of the Ingersoll-Rand Co., whose death from paralysis at his home, Westfield, N. J., Jan. 30, at the age of seventy-two, was briefly noted in these columns last week, was of world wide repute as a facile and practically successful inventor, especially in the line of rock drills, air compressors and mining machinery in general, his active life having been coincident with the period of development of the modern and phenomenally efficient apparatus now so widely employed and with so industrially revolutionary effect, he having been a leading and constantly active agent not only in the line of invention and improvement, but also in developing

HENRY CLARK SERGEANT.

the details and means of precise and economical manufacture.

Mr. Sergeant was born at Rochester, N. Y., but his earlier years were spent in Ohio. He was of unceasing activity, both mental and physical, from the beginning. He had only a common school education, and was working in the machine shop at a very early age. His irrepressible inventive faculty made work for itself from the first, his earliest known practical inventions made at the age of eighteen having to do with the manufacture of wagon wheels. His first United States patent, issued when he was nineteen, was for a boiler feed apparatus. Succeeding patents suggest the wide range of applicability of his inventive faculty. In December, 1858, he patented a steam engine governor. This was in fact, a governor for marine engines to prevent their racing to destruction when the wheels were out of water. He had after that patents respectively for gas regulators, for steam pumps,

four for steam boilers, five for brick machines, a fluting machine, six for water meters, all these before he had struck what must now be considered his real life work.

The water meter inventions really brought him in touch with the rock drill as in these and their manufacture he became associated with Jose F. De Navarro, who was also interested in the drills. The first patent in 1873, nominally for a rock drill, had to do with the tripod. The next patent, "valve motion for reciprocating engines," was really for a tappet drill. It is not necessary to mention in detail the patents which followed. With a single exception they all applied to air compressors, rock drills, coal cutters, channelers, and the constantly extending range of rock cutting and excavating machinery. They were practically all of value and in the aggregate had an enormous influence in the phenomenal growth of the company with which he was associated. The exception noted was the ticket cancelling box in use upon the elevated roads and elsewhere. Mr. Sergeant had one patent in which he was a joint inventor with Simon Ingersoll, the inventor of the drill which bears his name. Later the Sargeant drill appeared which was built for several years by the firm of Sergeant & Cullingsworth, their final location being at 9th avenue and 27th street, New York. The Ingersoll-Sergeant Drill Co. began in 1887, succeeding to this business and continuing in the same location until 1893, when the works in Easton, Pa., were built, the great works at Phillipsburg, N. J., being a necessity a decade later and the consolidation of the two foremost but competing companies in the world into the Ingersoll-Rand Co. being also a natural sequence.

Mr. Sergeant was a fortunate inventor, in that his inventions were so completely successful in the accomplishment of the purposes for which they were designed and have attained such a leading position in the large operations which accompany the advance of modern civilization, although he realized from them no great fortune and at best attained little more than a modest competence. As an inventor he had no specialty except to accomplish the thing which it came in his way to do. His chief characteristic may be said to have been a certain mental alertness, a quickness to see the little thing lacking, and to supply it, transforming a device of doubtful value often into a great success.

Mr. Sergeant was a man of all embracing interests and of most extensive experience, a genial companion in the hours of leisure as he was an indefatigable worker when anything was to be done, and he accomplished much. He leaves a wife, a son and three daughters.

CONFIDENT FEELING

Prevails in Canada.—Prospects for Business are Excellent.

Toronto, Can., Feb. 7.—Every line of the iron and steel trade is active and prices firm, and there is a general feeling of confidence in view of the assured heavy demands of the coming season. In addition to the requirements of the railroads, the building season is sure to be very active in Toronto and the larger centers, with large demands for structural steel and material. Prospects for the wire trade were never better, the output of the mills being all sold for spring delivery at prices 15 per cent higher than those of last summer. The export trade is not likely to be large for some time to come, in spite of the efforts of Canadian commercial agents abroad to extend it. J. S. Larke, Canadian agent at Sydney, Australia, has written to the Canadian Manufacturers' Association that in consequence of the desire to build up trade with Australia he has secured orders for Canadian manufacturers, and on sending them here has received replies to the effect that the manufacturers were unable to fill them. General Secretary Murray, of the association replied that the rapid expansion of the Canadian market kept the manufacturers busy supplying the home demand.

The Hamilton Steel & Iron Co., which recently obtained permission to issue $500,000 additional stock to build an addition, finding that it can pay for the work out of the reserve fund, will divide the $500,000 new stock pro rata, among the shareholders as a bonus, one share to every three shares of the old.

The King Radiation Co., of Montreal, is negotiating with the city authorities, as it is desirous of establishing a $200,000 plant there, if given a free site. It has been offered three acres of land, and 11 acres of water in the Ashbridge Bay district, but wants two or three acres more land.

The details of Canadian Pacific railway construction work in the west, provided for in this season's estimates, include in addition to the completion of numerous branches now under way, the changing of some 330 miles of light steel to 80-pound rails, and the double-tracking of about 326 miles. The grade reduction work undertaken between Lethbridge and Macleod on the Crows Nest Pass route, will entail the building of a viaduct about a mile in length, to take the place of a number of old trestle bridges. The viaduct will be constructed of steel and concrete. The plate girders will be carried on steel towers 300 feet in height, these resting on concrete foundations. The grade reduction between Field and Hector, which will bring down a 4.5 grade to 2.2, will be accomplished by the construction of a couple of tunnels under a mountain barrier.

The Dominion Iron & Steel Co.'s rod mill turned out 7,960 tons during January, thereby, it is claimed, breaking the world's record in this branch of production.

The output of steel ingots at the Algoma Steel Works, Sault Ste. Marie, for January was 23,496 tons.

The Ottawa Car Co. will build a new works covering several acres for the expansion of its business, which will embrace the construction of railway rolling stock, as well as its present lines of electric cars, carriage work, etc.

The Dominion Bridge Co., of Hamilton, Ont., recently secured a contract from the city of Toronto for the steel and iron work for the new Central fire hall for $4,200. The company took objection to a clause in the agreement requiring it to pay union wages to the workmen and refused to sign it. The next lowest tender was for $5,300. The city controllers refused to let the contract and instructed the city architect to buy the necessary steel and iron and have the work done by day labor.

PIG IRON PRODUCTION LAST YEAR.

The American Iron and Steel Association has received from the manufacturers complete statistics of the production of all kinds of pig iron in the United States in 1906. Detailed statistics of production will be found on the following page. Reports of production have been received directly from every furnace in the country.

On Dec. 31, 1906, there were 27 furnaces in course of erection and five furnaces were being rebuilt. Of the building furnaces two were located in New York, 11 were in Pennsylvania, two were in Alabama, three were in Ohio, five were in Indiana, two were in Illinois, one was in Wisconsin, and one was in Colorado. All these furnaces when completed will use coke or mixed anthracite coal and coke for fuel. Of the five rebuilding furnaces one was in Pennsylvania, two were in Alabama, one was in Illinois and one was in Washington. When rebuilt four furnaces will use coke for fuel and one furnace will use charcoal. In addition there were 23 furnaces projected and one furnace partly erected on Dec. 31. If built all the projected furnaces will use mineral fuel.

PRODUCTION OF PIG IRON IN THE UNITED STATES.

Total Production of All Kinds of Pig Iron.

TOTAL PRODUCTION OF PIG IRON BY STATES.

States.	Blast Furnaces. In blast June 30, 1906.	Dec. 31, 1906. In.	Out.	Total.	Production. Gross tons of 2,240 pounds. (Includes spiegeleisen and ferro-manganese.) First half of 1906.	Second half of 1906.	Total for 1906.
Massachusetts	1	1	1	2	10,218	10,021	20,239
Connecticut	2	3	0	3			
New York	18	17	8	25	746,271	806,388	1,552,659
New Jersey	8	9	2	11	167,820	211,570	379,390
Pennsylvania	130	132	23	155	5,688,743	5,559,126	11,247,869
Maryland	4	4	1	5	194,907	191,802	386,709
Virginia	14	14	11	25	257,806	225,719	483,525
North Carolina	0	0	1	1			
Georgia	3	2	2	4	46,865	45,734	92,599
Texas	1	1	3	4			
Alabama	26	31	16	47	825,090	849,758	1,674,848
West Virginia	3	3	1	4	136,662	167,872	304,534
Kentucky	4	5	4	9	35,533	62,594	98,127
Tennessee	14	13	8	21	203,569	223,305	426,874
Ohio	53	57	7	64	2,675,812	2,651,321	5,327,133
Illinois	20	22	0	22	1,011,639	1,145,227	2,156,866
Michigan	10	12	0	12	175,672	193,784	369,456
Wisconsin	5	6	0	6	190,949	182,374	373,323
Minnesota	1	1	0	1			
Missouri	2	2	0	2			
Colorado	4	5	0	5	214,694	198,346	413,040
Oregon	0	0	1	1			
Washington	0	0	0	0			
Total	323	340	89	429	12,582,250	12,724,941	25,307,191

PRODUCTION OF BITUMINOUS COAL AND COKE PIG IRON.

New York	17	16	1	17	742,949	762,252	1,505,201
New Jersey	3	4	1	5	113,523	139,984	253,507
Pennsylvania	96	89	7	96	4,981,814	4,876,047	9,857,861
Maryland	4	4	0	4	193,498	191,802	385,300
Virginia	13	13	9	22			
North Carolina	0	0	1	1	293,124	257,203	550,327
Georgia	1	1	1	2			
Texas	1	1	0	1			
Alabama	24	30	11	41	814,440	834,578	1,649,018
West Virginia	3	3	1	4	136,662	167,872	304,534
Kentucky	3	4	4	8	34,580	61,365	95,945
Tennessee	13	12	6	18	203,035	221,306	424,341
Ohio	51	56	2	58	2,674,137	2,647,546	5,321,683
Illinois	20	22	0	22	1,011,639	1,145,227	2,156,866
Michigan	1	2	0	2	175,673	178,718	354,391
Wisconsin	4	5	0	5			
Minnesota	1	1	0	1			
Missouri	1	1	0	1	235,932	218,592	454,524
Colorado	4	5	0	5			
Total	260	269	44	313	11,611,006	11,702,492	23,313,498

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	1	1	5	6	57,619	115,722	173,341
New Jersey	5	5	1	6			
Pennsylvania	32	42	12	54	705,903	681,442	1,387,345
Total	38	48	18	66	763,522	797,164	1,560,686

PRODUCTION OF CHARCOAL PIG IRON BY STATES.

Massachusetts	1	1	1	2	10,218	10,021	20,239
Connecticut	2	3	0	3			
New York	0	0	2	2	1,026	1,637	2,663
Pennsylvania	2	1	4	5			
Maryland	0	0	1	1	2,727	2,176	4,903
Virginia	1	1	2	3			
Alabama	2	1	5	6	10,650	15,180	25,830
Georgia	2	1	1	2			
Texas	0	0	3	3	*11,716	15,302	*27,018
Kentucky	1	1	0	1			
Tennessee	1	1	2	3			
Ohio	2	1	5	6	1,675	3,775	5,450
Michigan	9	10	0	10	137,031	144,337	281,368
Wisconsin	1	1	0	1			
Missouri	1	1	0	1	32,679	32,857	65,536
Oregon	0	0	1	1			
Washington	0	0	0	0			
Total	25	23	27	50	207,722	225,285	433,007

* Includes about 500 tons of pig iron made in Georgia in the first half of 1906 with charcoal and coke mixed as fuel. No iron was made with this fuel in the last half of 1906.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Bituminous	260	269	44	313	11,611,006	11,702,492	23,313,498
Anthracite	38	48	18	66	763,522	797,164	1,560,686
Charcoal	25	23	27	50	207,722	225,285	433,007
Total	323	340	89	429	12,582,250	12,724,941	25,307,191

Miscellaneous Pig Iron Statistics.

PRODUCTION OF PIG IRON IN PENNSYLVANIA AND OHIO.

	Districts.	Blast Furnaces. In blast June 30, 1906.	Dec. 31, 1906. In.	Out.	Total.	Production. Gross tons of 2,240 pounds. (Includes spiegeleisen and ferro-manganese.) First half of 1906.	Second half of 1906.	Total for 1906.
Pennsylvania.	Lehigh Valley	19	20	7	27	333,179	311,911	645,090
	Schuylkill "	13	15	1	16	352,599	361,847	714,446
	L. Susq. "	14	14	5	19	334,526	337,768	672,294
	Juniata "	5	6	4	10	106,794	89,719	196,513
	Allegheny Co.	42	40	2	42	2,856,327	2,846,394	5,702,721
	Shenan. Valley	20	20	0	20	1,026,306	920,873	1,947,179
	Miscel. bitum.	15	16	0	16	677,986	688,977	1,366,963
	Charcoal	2	1	4	5	1,026	1,637	2,663
Ohio.	Mahoning Val.	15	17	0	17	949,222	987,714	1,936,936
	Hocking "	1	1	0	1	744,139	734,591	1,478,730
	Lake Counties	11	11	1	12			
	Miscel. bitum.	15	16	0	16	774,734	728,058	1,502,792
	H. R. bitum.	9	11	1	12	206,042	197,183	403,225
	H. R. charcoal	2	1	5	6	1,675	3,775	5,450

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York and New Jersey	376,271	413,731	790,002
Pennsylvania	3,220,655	3,140,039	6,360,694
Maryland and Virginia	193,498	186,825	380,323
West Virginia, Tennessee, and Kentucky	141,741	200,925	342,666
Ohio	1,927,344	1,942,860	3,870,204
Illinois	817,182	859,640	1,676,822
Michigan, Wisconsin, and Minnesota	91,190	76,798	167,988
Colorado	117,000	134,819	251,819
Total	6,884,881	6,955,637	13,840,518

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO BY DISTRICTS.

Pennsylvania.	Lehigh Valley	67,122	80,025	147,147
	Schuylkill Valley			
	Lower Susquehanna Valley	267,184	289,016	556,200
	Allegheny County	1,904,927	1,882,391	3,787,318
	Shenango Valley	712,010	610,118	1,322,128
	Miscellaneous bituminous	269,412	278,469	547,881
	Charcoal	0	20	20
Ohio.	Mahoning Valley	710,597	741,246	1,451,843
	Lake Counties	601,843	587,658	1,189,501
	Hanging Rock bituminous	73,849	51,781	125,630
	Miscellaneous bituminous	541,055	562,175	1,103,230

PRODUCTION OF BASIC PIG IRON, NOT INCLUDING CHARCOAL IRON.

New York and New Jersey	118,536	145,411	263,947
Pennsylvania—Allegheny County	845,780	874,059	1,719,839
Other counties	831,351	811,132	1,642,483
Virginia and Alabama	267,379	302,593	569,972
Ohio, Illinois, Missouri, and Colorado	386,229	436,204	822,433
Total	2,449,275	2,569,399	5,018,674

PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania	105,117	90,708	195,825
New Jersey, Maryland, Ill., and Colorado	55,716	48,959	104,675
Total	160,833	139,667	300,500

PRODUCTION OF ALL KINDS OF PIG IRON FROM 1902 TO 1906.

States.	Gross tons of 2,240 pounds. 1902.	1903.	1904.	1905.	1906.
Massachusetts	3,360	3,265	3,149	15,987	20,239
Connecticut	12,086	14,501	8,922		
New York	401,369	552,917	605,709	1,198,068	1,552,659
New Jersey	191,380	211,667	262,294	311,039	379,390
Pennsylvania	8,117,800	8,211,500	7,644,321	10,579,127	11,247,869
Maryland	303,229	324,570	293,441	332,096	386,709
Virginia	537,216	544,034	319,526	510,210	483,525
North Carolina, Georgia, Texas	35,410	87,255	75,686	38,699	92,599
Alabama	1,472,211	1,561,398	1,453,513	1,604,062	1,674,848
West Virginia	183,005	199,013	270,945	298,179	304,534
Kentucky	110,725	102,441	37,106	63,735	98,127
Tennessee	392,778	418,368	302,096	372,692	426,874
Ohio	3,631,388	3,287,434	2,977,929	4,586,110	5,327,133
Illinois	1,730,220	1,692,375	1,655,991	2,034,483	2,156,866
Michigan	155,213	244,709	233,225	288,704	369,456
Wisconsin, Minnesota, Missouri	273,987	283,516	210,404	351,415	373,323
Colorado, Washington	269,930	270,289	151,776	407,774	413,040
Total	17,821,307	18,009,252	16,497,033	22,992,380	25,307,191

RAPID GROWTH

OF IRON AND STEEL INDUSTRIES OF BUFFALO DISTRICT.

First Electrically-Operated Steel Mill in the Country.—Pig Iron Production Not Yet Equal to the Demand.

Within the past six years the Buffalo district has rapidly developed as an iron and steel producing center, and since the initial operations of the Lackawanna Steel Co. were begun, its growth has been marked. An abundant steel supply in the form of billets and sheet bars, afforded not only by the Lackawanna Steel Co., but by the New York State Steel Co. as well, has attracted two finishing mills to this center during the last twelve months and the development of other projects for the manufacture of the more highly finished materials is anticipated in the near future.

The Seneca Iron & Steel Co., recently incorporated, will engage in the manufacture of sheets from bars furnished by the Lackawanna Steel Co. Its site adjoins the Lackawanna plant, thus entailing only a short haul for its steel supply. The plant will contain seven 26-inch hot mills and sufficient cold rolling capacity to take care of this output. The contract for all of the mills has been awarded to the Lewis Foundry & Machine Co., Pittsburg. They will be electrically driven, and as soon as the details of this equipment have been completed, contracts will be let. This plant will have the distinction of being the first electrically operated sheet mill in the United States, although motors have been successfully used in Germany for some time. The main building will be 440 x 112 feet, and will be commanded throughout its entire length by electric traveling cranes of 10 and 25 horsepower capacity each. A galvanizing plant, 70 x 250 feet, will also be built and a corrugating department of the same size will be added in the near future. The contract for the erection of the buildings has been awarded the Riter-Conley Mfg. Co., Pittsburg, and operations will be commenced about July 1. To provide this company with bars, the Lackawanna Steel Co. is now installing an 8-inch bar mill, the contract for which has been awarded the Morgan Construction Co., Worcester, Mass.

The Seneca Iron & Steel Co. is capitalized at $300,000, and has organized by the election of the following officers: James S. Patterson, president; Hugh Kennedy vice president; H. M. Van Horn, secretary; and Alexander Patterson, treasurer. The offices of the company are in the Erie County Bank building.

The Shenandoah Steel Wire Co. is another independent finishing mill erected just outside of the confines of the city of Buffalo, within a few miles of the plant of the Lackawanna Steel Co., and will likewise draw its steel supply from Buffalo mills. The mill buildings range in height from one to three stories and are constructed of concrete blocks. A part of the equipment will consist of 302 multiple die wire drawing machines. They will be electrically driven by Westinghouse motors. The power and lighting systems will be electrical and will be furnished by the Niagara, Lockport & Ontario Power Co., Niagara Falls, steam being used for heating purposes only.

The New York State Steel Co. is now completing a plant in Buffalo for the manufacture of billets, and will commence operations about March 1. Its steel plant contains two 250-ton Talbot furnaces, which will have a daily output of 250 tons each. The ingots will be broken down to 4 x 4 inch billets on a 42-inch blooming mill installed by Mackintosh, Hemphill & Co., Pittsburg. This mill has been completed about two months and is ready to operate as soon as steel is available. This company is now completing a blast furnace 86 feet high, having a bosh 21 feet 6 inches in diameter, which will be completed about Jan. 1, next, and has plans for other extensive additions, including a second blast furnace, three Talbot furnaces, and finishing mills, the nature of which has not as yet been determined. The ultimate capacity of this plant will be 1,000 tons of pig iron and steel daily, the blast furnaces having been designed for a rated output of 500 tons each.

The erection of the two furnaces of the Buffalo & Susquehanna Iron Co. within the last three years has increased the merchant iron production of this district 600 tons daily, but so rapid has been the growth of iron consuming industries that other iron producing centers continue to be heavily drawn upon to meet the current requirements.

STARTING OF CARNEGIE STEEL GAS ENGINE.

Something over a month ago there was started at the Edgar Thomson works of the Carnegie Steel Co. the first large gas power installation in America, using blast furnace gas and double acting four cycle gas engine of a large capacity. This event is of rather unusual importance, as it marks the commencement of a new regime in methods of power generation of the Steel Corporation, which has already taken a stand in favor of the internal combustion type of prime mover. The engine was designed by the Westinghouse Machine Co., but the design was not an untried one as a number of gas engine units of similar design, but smaller capacity (500-horsepower) have been in operation elsewhere with success.

The Carnegie blowing unit was started for the first time on Dec. 7, and after a trying out period of only two days, was put into regular service. The engine has since carried the regular load during the daily run without developing external or internal defects either in structure or operation. A rigid inspection of the working parts after a few days' run failed to uncover, the least evidences of wear or excessive stresses, and during a month's daily operation no premature or back firings have occurred.

Although this gas engine unit furnishes an uninterrupted supply of air for blowing purposes, the duty imposed upon it is by no means uniform. Owing to changes in the compactness of the furnace burden the air pressure must vary in proportion. The usual range is 14 to 20 pounds per square inch, except when the furnaces are tapped when the pressure reduces to five pounds On the other hand, when the furnaces are closely packed the pressure may increase to 20 pounds. These variations in pressure delivery are accompanied by corresponding variations in the quantity of air delivered, all of which is taken care of by the valve gear, while the speed of the engine is entirely under the control of a sensitive centrifugal regulator designed upon the relay principle, but controlling the gas inlets individually and directly at the point of gas supply. A speed changing mechanism provides means for manual control of the speed of the blowing unit when desired.

Much experience has developed during the past two or three years in the operation of large gas engines on natural gas. It is, however, worthy of note that the use of "dirty" gas, either producer or blast furnace, is a very different problem, so difficult as to establish a very narrow margin between success and failure where the necessary experience in its use has not previously been acquired. But in adopting the large gas engine as a standard form of prime mover in steel plants, the Carnegie Steel Co. has not been blindly dependent upon skill of gas engine designers. For a long period a 500-horsepower Westinghouse gas engine of design similar to the large unit was maintained in daily operation at the steel plant for purposes of experimentation. During a 30-day test of 24 hours per day, including Sundays, this experimental unit sustained regular commercial load with but two stops, equivalent to a run of 99 1-3 per cent of the elapsed time. One of these stops was due to the failure of the gas supply. At the end of this run the engine was found to be in excellent condition.

Improved Sentiment Shown in Stocks.

A noticeable improvement in sentiment with a more confident tone regarding future conditions and bringing with it a moderate rally in prices, has tended to return reassurance to the stock market in the past week. Relief from the urgent selling movement which has been forcing quotations to gradually lower levels was apparent in the strength of many stocks. There were weak spots in the market here and there due either to belated liquidation of jeopardized speculative accounts or to a listless attack by the dominant bear party in its effort to keep prices on the descendancy. These currents of influence tended to produce an unsettled condition for the greater part of the week and quotations moved at a sluggish rate. In the closing days a more assured tone was noticeable, and the uncovered bear interest bought more freely its short contracts. Notable changes were lacking and the exchange situation was more in the order of a readjustment of the liquidation which had been in progress. The development of an investment demand for stocks, though manifested in small parcels. was a significant movement. Though not an important element in itself in its influence upon prices, this activity is regarded as indicating the investor's estimate of true values. It is of more permanent character than the ordinary speculative operations in the market and serves to reduce the floating supply of securities and to effect a wider distribution, thus exercising a check upon radical price movements. The easing of the money market has brought about the recurrence of this trading. There has been a noticeable change for the better in the apprehension regarding the future of the railroad as regards the position of the president in the prevailing agitation. It is believed that as a consequence of conditions in the money market, railroad expenditures during the year for new construction and improvements will be less than the plans originally called for. This will have the effect of reducing the demand of certain products and the influence upon the business and money market is manifest. A confidence is aparent, however, that this easing of business conditions will prove an adjustment in itself, and with fair crops and a clear defining of political conditions, a substantial strength for the market will be gained The contemplated raise in freight rates under consideration by railroads is attracting keen interest among stock traders at present on account of its probable effects. Money conditions as revealed by the New York bank statement showed a decided decline in reserve power. The banks last week lost $12,000,000 in reserve and increased their loans over $1,500,000. This resulted in the decrease of the surplus reserve of $9,288,000. Rates for money at New York are easier than at the principal cities in the interior and this has brought a waning flow of money to the metropolis from its feeding sections. Steel stocks participated in the general improvement of conditions and gains were frequent. United States Steel showed only a moderate activity with sales of 293,700 common and 44,790 preferred. Total sales for the week on the New York Exchange were 3,710,456 shares.

Financial Notes:—

At the annual meeting of the Kilbourne & Jacobs Mfg. Co., Columbus, O., it was declared to be the policy of the company to put the common stock on an 8 per cent basis, and this year four dividends of 2 per cent each will be declared on it, an increase of 2 per cent a year over 1906. The company has $625,000 of preferred stock on which 6 per cent is paid and $1,250,000 of common stock on which 8 per cent will now be paid.

Books for the following stocks have been closed for the purpose of computing dividends: Pressed Steel Car preferred, Empire Steel & Iron and United States Steel preferred.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Feb. 9	Changes In Week	Date 1907 Ann. Meet.	Stock Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Pay.
Allis-Chalmers	15	+ ⅛	Sept.	19,820,000			
Allis-Chalmers pr	38	+ ⅜		16,150,000	7 cum		Feb., 1904
American Can	6¼	+1⅛	Feb. 5	41,233,300			
Am. Can pr	55¾	+4⅜		41,233,300	7 cum	5 Q.	Jan., 1907
Am. Car and Fdy	43⅝	+1⅛	June 27	30,000,000		1¼ Q.	Jan., 1907
Am. Car and Fdy pr	102½	+1⅝		30,000,000	7 n. c.	7 Q.	Jan., 1907
American Loc	70⅞	— ⅜	Oct. 5	25,000,000		1¾	Feb., 1907
American Loc. pr	110½	— ⅜		24,100,000	7 cum	7 Q.	Jan., 1907
American Ship.	78	+ ¼	Oct. 2	7,600,000	6	1 Q.	Dec. 1906
American Ship. pr	108½	+1¼		7,900,000	7 n. c.	1¾ Q.	Jan. 1907
Am Steel Foundries	9⅝	+ ⅛	Oct. 1	15 810,000			
Am. Steel Foundries pr	43¼	+ ⅜		17,240,000	6 cum		Aug., 1904
Barney & Smith	71	+1	June 4	2,000,000	4	4	Dec., 1906
Barney & Smith pr	138	.....		2,500,000	8 cum	8 Q.	Dec., 1906
Bethlehem Steel	18¼	....	April 2	14 862,000			
Bethlehem Steel pr	56	.....		14,908,000	7 n. c.	3 Q.	Feb., 1907
Cambria Steel	45⅝	+2½	Mar. 19	45,000,000*	6	3 Q.	Feb., 1907
Cambria Iron	46	— ⅛		8,468,000*	4	4 S. A.	Oct., 1906
Chicago Pneumatic Tool	47	—3	Feb 18	6,145,800	4	4 Q.	Jan., 1907
Colorado Fuel	48⅜	+1⅜	Oct. 21	30,132,000			Apr., 1903
Crucible Steel	11⅝	+ ⅛	Oct. 16	24,578 400			
Crucible Steel pr	77⅞	+ ¾		24,436,500	7 cum	6	Dec., 1906
Empire Steel	5	—2	Feb. 27	2,281,400			
Empire Steel pr	47	.....		2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	95	.....	Feb. 19	1,000,000	6	6 Q.	Nov., 1906
Fay & Egan pr	128½	.....		1,000,000	7 cum	7 Q.	Nov., 1906
General Electric	160¾	+2¾	May 14	54,356,000	8	8 Q.	Jan., 1907
Harbison-Walker	12¼	. .	Jan. 21	18,000,000	6		
Harbi on-Walker pr	75	+ ¼		9,600,000	6 cum	6 Q.	Jan., 1907
International Pump	35¾	+1⅜	June 4	17,762,500		2	Apr., 1905
International Pump pr	79¾	+1¾		11,850,000	6 cum	6 Q.	Feb., 1907
Lackawanna Steel	60	....	Mar. 13	34,971,400			
Lake Sup. Corp	14⅛	+ ⅛	Oct. 2	40,000,000			
New York Air Brake	138	+3	June 18	10,000,000	8	8 Q.	Jan., 1907
Niles-Bement-Pond	130	.....	Feb. 6	5,000,000	6	6 Q.	Sept. 1906
Niles-Bement-Pond pr	105	.....		2,000,000	6 cum	6 Q.	Dec., 1906
Otis Elevator Co	50	—2	March 18	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. pr	94	.....		6,308,500	6 n. c.	6 Q.	Jan., 1907
Penn. Steel	67	+1	May 13	10,750,000			
Penn Steel pr	104	.....		16,500,000	7 n. c.	7 S. A.	Apr., 1906
Pittsburg Coal Co	16	— ¼	Feb. 11	29,045,400			Nov
Pittsburg Coal pr	58⅛	+2⅛		30,217,700	7		Apr., 1905
Pressed Stl Car	50⅛	+2⅛	Feb. 20	12,500,000		3	Aug., 1904
Pressed Stl. Car pr	98⅜	— ⅛		12,500,000	7 n. c.	7 Q.	Feb., 1907
Pullman	168⅝	.....	Oct. 17	100,000,000	8	8 Q.	Feb., 1907
Railway Stl. Spring	53	+1¾	Mar 7	13,500,000		4 S. A.	Oct., 1906
Railway Stl Spring pr	98½	+1		13,500,000	7 cum	7 Q.	Dec. 1906
Rep Iron & Steel	36	+2	Oct. 9	27,191,000			
Rep Iron & Steel pr	98¼	+1½		20,416,000	7 cum	7 Q.	Jan., 1907
Sloss-Sheffield	71	+1⅛	Mar. 5	10,000,000	5	5 S. A.	Oct., 1906
Sloss-Sheffield pr	103	+1		6,700,000	7 n. c.	7 Q.	Jan., 1907
Tenn. Coal & Iron	155¾	—1⅝	May	22,553,600	4	4 Q.	Feb., 1907
U. S. Pipe & Fdy	45⅛	— ⅜	June 26	12,500,000	4	4 Q.	Dec., 1906
U. S. Pipe & Fdy. pr	87	....		12,500,000	7 n. c.	7 Q.	Dec., 1906
U. S. Steel	44½	+ ⅝	April 15	508,302,500	2 n. c.	½ Q.	Mar., 1907
U. S. Steel pr	104⅛	— ⅛		360,281,100	7 cum	7 Q.	Feb., 1907
U. S. Steel 5's	99	+ ⅜		463,796,000	5	5 A.	
Va. Iron, Coal & Coke	87⅛	—2⅛	Sept. 17	8,641,600			
Westinghouse Elec	150	. .	June 26	20,996,350*	10	10 Q.	Jan., 1907
West'ghouse Air Brake	156	+1	Oct. 1	11,000,000*		22½ Q.	Jan. 1907

Par value of shares, $100, except those starred, $50.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Southwestern Iron Works Co., Guthrie, Okla., has increased its capital stock from $25,000 to $50,000.

The American Machine Mfg. Co., Detroit, Mich., has increased its capital stock from $60,000 to $100,000.

The Toledo-Massillon Bridge Co., Toledo, O., has increased its capital stock from $300,000 to $400,000.

The Wayne Iron Ore Co., Buffalo, has been chartered with $250,000 capitalization by M. M. Drake, H. B. Chamberlain and F. W. H. Jones, all of that city.

The Vulcan Engine & Machine Co., Wilmington, N. C., has been organized with a capitalization of $10,000 by J. A. Lockfaw, J. L. Grafflin and W. P. Carroll.

The Rock Island Tool Co., Rock Island, Ill., has been incorporated with a capital of $50,000 by Frank G. Young, C. J. Larkin and C. E. Shields.

Illinois Modern Machine Co., Chicago, Ill., has been organized with a capitalization of $25,000 by Elijah N. Zoline, Frances G. Main and James E. Bowles.

The Acme Foundry Co., Pittsburg, Pa., has been organized with a capitalization of $25,000 by Marcellin C. Adams, Edward Oberndorf and Sidney S. Klinordlinger, Pittsburg.

The Dockery Heating & Sheet Metal Co., St. Louis, Mo., has been organized with a capitalization of $15,000 by James J. Dockery, Leo J. Dockery and Elizabeth N. Dockery.

The Rochester Automatic Boiler Feed Co., Rochester, N. Y., has been incorporated with $40,000 capitalization by W. H. Smith, M. H. Smith, J. H. Faulkner and G. Berns, all of that city.

The Heimann Foundry & Machine Co., Massillon, O., has been organized with a capitalization of $50,000 by M. W. Oberlin, F. G. Harrison, August Andrew Reise and H. C. Dielhem.

The V. M. Kluge Co., Syracuse, N. Y., has been incorporated to manufacture iron and steel products. The capitalization is $15,000 and the incorporators are V. M. Kluge, C. A Fox and F. F. Mesmer, all of Syracuse.

The Armor Steel & Foundry Co., Matthews, Ind., has been incorporated to do a general steel casting business. The capital stock is $25,000, and the incorporators are: William S. Freeman, William B. Moore and George P. Swift.

The Huddlestone Mining, Milling & Smelting Co., Cincinnati, O., has been incorporated with a capital of $25,000 by Peter J. Schneider, Frank Brinkmoeller, Conrad Conen, Otto Sammerding and Bernard Brandt.

The Russell Foundry & Machine Works, Queens Borough, New York, has been incorporated for $20,000 to carry on a foundry and machine shop business. The incorporators are F. Russell, Great Neck; J. Russell, Flushing and R. R. Resquin, New York City.

The Builders' Hardware Co., Brooklyn, N. Y., has been incorporated to manufacture hardware rasps and tools, with a capitalization of $5,000. Those interested are: Louis Levinson, Philip Levinson, Paul Zipkin, 18 Harrison avenue, Brooklyn.

Titanium Steel Co., New York, has been incorporated to manufacture iron, steel and other metals. The capital stock is $125,000, and the incorporators are: Daniel M. Miers, Thomas Hall, 253 Broadway, New York; and J. A. Wilson, Hasbrouck Heights, N. J.

The Standard Thermostat Co. has been organized at Kittery, Me., with a capital of $500,000 to deal in machinery. The promoters are: Percy C. Howe, Cambridge, Mass.; Charles S. Johnson, Newton, Mass.; S. J. Morrison, Portsmouth, N. H.; Horace Mitchell and M. G. Mitchell, Kittery.

The Southgate Building Co., Boston, Mass., has been incorporated to manufacture elevators with a capitalization of $9,000. The incorporators are: William N. Hartshorn, The Fenway, Boston, Mass.; Arthur J. Crackett, West Roxbury, Mass., and J. Albert Briggs, West Roxbury, Mass.

The Midvale Mining Co., Midvale, Va., has been organized with a capital stock of $250,000 to mine manganese and iron ores. The officers of the company are: John P. Cohalen, president; Benjamin H. Irving, vice president, both of New York; C. A. Geatty, secretary, and F. W. Schultz, treasurer, both of Baltimore, Md. The main office of the concern will be located at 1015 East Fayette street, Baltimore.

New Construction:—

The Forged Steel Wheel Co., New Castle, Pa., is preparing for the construction of four new buildings at its present plant. The railroad tracks, which will encircle the mill, are now being laid, and as soon as they are completed work of excavation will begin.

The Buffalo Pitts Co., Buffalo, N. Y., builder of threshing machinery, portable and traction engines, etc., states that the addition to its plant consists of a one-story brick building for engine testing room and paint shop, 75 x 175 feet. No equipment will be required.

L. H. Howard, Neillsville, Wis., states that he is intending to erect a building 40 x 68 feet, three stories and basement, part of which will be used by him as a machine shop for repairs and small manufacturing. He is in the market for lathe and other machine tools, either new or second hand.

Barnum Brothers, contractors, Falls City, Ore., report that they are in the market for a large supply of machinery and material for an extensive machine shop for the new Pacific & Oregon Central Railway Co., and for a large amount of steel material for 30 miles of new railroad which they are to build for the new line.

The Brighton Car Co., Chicago, a new corporation, with temporary office at 503 Teutonic building, has purchased five acres of land on South Rockwell street, in that city, and has begun the erection of a factory, one story, of brick, to cost $30,000. The company will repair cars, and the plant will have a capacity of 100 cars a week. The building will be ready by April 1. Frank Kellersman is president and Charles Blackford, secretary.

The Berlin Construction Co., Berlin, Conn., has received a contract for building an extension to the fan shop of the Green Fuel Economizer Co., Matteawan, N. Y., which will double the capacity of the latter plant. A shop has also been put up exclusively for manufacturing the new patent Green steam and hot-water heating coil. The pressure of business in these lines and also in the manufacture of fuel economizers has compelled the Green Fuel company to acquire for building purposes several acres of land adjacent to the present property.

Plans have been prepared by the Griffin Wheel Co., Chicago, for the erection of an extensive plant on a 10-acre site at Pullman. It will comprise a foundry, 300 feet square, of steel and concrete construction, cleaning room, three charging rooms 50 x 222 feet; 2½ story core room, 59 x 100 feet; 2½ story machine shop; a carpenter shop, 19 x 70 feet; a store house, 28 x 111 feet; cleaning room platform, 19 x 300 feet; an old wheel platform, 90 x 400 feet; machine shop platform, 18 x 50 feet; a two-story office building, 30 x 62 feet, and other structures such as sheds, bins, etc. Three 100 inch cupolas will be installed and other car wheel equipment will be purchased. The plant will be very conveniently arranged, and will cost, with equipment, about $1,000,000. Architect Harry E. Stevens, 2146 West Monroe street, Chicago, has prepared the plans.

General Industrial Notes:—

The Smethport Cutlery Co. will ask for a state charter to build a plant at Smethport, McKean county, Pa.

The property of the American Can Co., South Bellingham, Wash., has been purchased by E. B. Deming for $70,000.

The purchase of the machinery and effects of the Sinking Spring Foundry Co., Sinking Spring, Pa., by James R. Wotherspoon, has been confirmed by the court.

The Hayden-Corbett Chain Co., of Columbus, O., has installed the machinery in its new additions, just completed, and the plant is now being operated to its full capacity.

The Ensley Machine & Foundry Co. has established a new foundry and machine shop at Ensley, Ala. The new concern will make iron, brass and other castings, excepting steel.

The Iroquois Iron Works, Buffalo, N. Y., says it has not purchased land at Chester, Pa., for the purpose of removing its plant to that city as stated in press dispatches.

The Cambria Steel Co. has purchased 5,000 acres of coal land along the Elk river, W. Va., from the Elk Valley Coal Co., composed of Connellsville, Pa., men, at a price of $75 an acre.

The Pittsburg Stove & Range Co. has chosen the following directors: John D. Nicholson, J. B. Jackson, H. M. Baldwin, F. R. Baldwin, A. M. Neeper, John S. Graham and George W. J. Bissell.

The G. M. Yost Mfg. Co., Waynesboro, Pa., has purchased the vise factory of Peter A. Frasse & Co., New York, including machinery, tools, patents, etc., and has moved the plant to Mechanicsburg, Pa. The company expects to have its new factory in operation by Feb. 10.

Francis L. Robbins was re-elected president of the Monongahela River Consolidated Coal & Coke Co. at the organization of the new board of directors at Pittsburg, Feb. 1. The other officers re-elected were as follows: Vice president, Geo. W. Theiss; secretary and assistant treasurer, James W. Barber; assistant secretary, C. H. Van Dyke; treasurer, W. H. Brunt.

The navy department has awarded the contract to the Bethlehem Steel Co., for 40,000 three-inch, 50-caliber forged steel common shells at $2.49 each, and to the American-British Mfg. Co., the contract for 20,000 three-inch, 50-caliber forged steel common shells at $2.49 each.

The Standard Boiler Co., Niles, O., at its annual meeting elected two new directors, F. W. Stillwagon, of Niles, and George Shafner, of Butler, Pa., The other officers re-elected were: E. A. Gilbert, D. J. Finney, Harry Unger, W. A. Thomas and C. T. Sweeney.

The annual meeting of the Cleveland branch of the National Metal Trades Association will be held March 7. Arrangements are being made for a banquet at which a number of prominent local manufacturers and several visitors of note in the industrial world will participate as speakers. The place of holding the banquet is as yet uncertain.

S. Alfred Reese, of Louisville, Ky., has acquired the interest of Charles H. Myerhoff in the Evansville Stove Works, Evansville, Ind., and has been admitted as a member of the board of directors. The new officers chosen for the ensuing year are: A. H. Kahn, president; S. A. Reese, vice president and general manager, and L. S. Kahn, secretary and treasurer.

William T. Van Brunt, president of the St. Joseph & Grand Island railroad, the Furnaceville Iron Co., and the Sinnemahoning Iron & Coal Co., has co-operated with eastern capitalists and purchased the copper mining property known as the North Butte extension located in the Butte, Mont., district from a western syndicate.

At the annual meeting of the Kilbourne & Jacobs Mfg. Co., Columbus, O., a change was made in the board of directors by the election of Judge W. T. Spear of the state supreme court to succeed the late George Kilbourne. The officers elected were: Col. James Kilbourne, president and general manager; Felix A. Jacobs, first vice president; James R. Kilbourne, second vice president and assistant general manager; Fred W. Hubbard, secretary; Frank C. Eaton, treasurer; Joseph D. Potter, auditor, and Lincoln Kilbourne, purchasing agent. The report of Col. Kilbourne, as president and general manager, showed 1906 to have been the greatest in the history of the plant. The completion of several improvements and of others in contemplation were discussed.

The annual report of the Buckeye Steel Castings Co., Columbus, O., submitted at the annual meeting of its stockholders recently, showed that the company has just passed through its most prosperous year. Large additions to the plant were erected during the year, and plans for other additions and improvements were approved by the stockholders. The directors except N. Monsarrat, who is succeeded by Mr. Goodwillie, were re-elected as follows: Frank Rockefeller, Cleveland; R. S. Warner, John G. Deshler, T. P. Linn, R. M. Rownd and S. B. Bush, Columbus, and Thomas Goodwillie, Baltimore. The board organized by electing the old officers as follows: Frank Rockefeller, president; R. S. Warner, first vice president; S. P. Bush, second vice president and general manager, and Arno Eberlein, secretary and treasurer.

Trade Notes:—

The Maheu & Coyle Mfg. Co., St. Louis, Mo., reports that it has installed about $7,000 worth of additional machinery since last spring and that its business has increased about 400 per cent over last year.

Robert W. Hunt & Co., Chicago, Ill., have been appointed consulting engineers to the receivers of the Union Traction Co., Chicago, and placed in direct charge of the lowering of the car tunnels under the Chicago river.

The Ferro Machine & Foundry Co., Cleveland, O., has sold 500 Ferro automarine engines to the W. H. Mullins Co., Salem, O., at an approximate price of $75,000. This is one of the largest contracts for small marine gasoline engine ever made in America.

The McCrum-Howell Co., 46-48 East Twentieth street, New York, has announced that owing to the advance in the cost of material, an increase of 10 per cent has been made in the price of all repairs for Richmond boilers and furnaces, effective Feb. 1.

Jones, Caesar, Dickinson, Wilmot & Co., certified public accountants, and Price, Waterhouse & Co., chartered accountants, have established a branch office at 307 Epler block, Seattle, Wash., under the general supervision of their resident partner in San Francisco, with John Medlock as local manager.

The Standard Sand & Machine Co., Cleveland, O., is building a complete plant for handling sand for continuous molding. This is to be installed in the plant of the Standard Ideal Co., Ltd., Port Hope, Canada. Like equipment is being installed for the American Car & Foundry Co., Detroit, Mich., for car wheel work. The capacity will be one car wheel per minute. The company is adding to its present business the specialty of conveying machinery for all kinds of material.

It was announced at the officers' and branch managers' convention of the Crocker-Wheeler Co., held Jan. 23 to 26, at the main office and works, Ampere, N. J., that the concern had done more business during 1906 than any other year since its organization, 18 years ago. Among the specialties that have brought success are alternating current generators of large capacity, direct current motors for machine tools and for all other kinds of machinery, rolling mill motors, transformers and induction motors.

The Stowe-Fuller Co., Cleveland, O., has just received a large order for its "Aluminite" brick for portable cement rotaries for the First Portland Cement Co., of South Africa. This is the second shipment made to the South African plant, in which both American machinery and American aluminite blocks are used for the manufacture of cement.

William H. Wood, hydraulic engineer and builder of special machinery, Medina, Pa., reports recent equipment contracts completed as follows: Warren City Boiler Works, Warren, O., sectional hydraulic flanging presses, accumulators, pumps, etc.; E. Leonard & Sons, London, Ont., hydraulic riveting plant; Walsh & Weidner Boiler Co., Chattanooga, Tenn., hydraulic sectional flanging press; Waterous Engine Works Co., Ltd., Brantford, Ont., hydraulic sectional flanging press; Union Iron Works, Erie, Pa., flanging press, hydraulic jib cranes and patent circular flanging machine; Allis-Chalmers Co., Chicago, Ill., sectional flanging press; Odlum-Taylor Boiler Co., Memphis, Tenn., a complete hydraulic riveting plant, consisting of a triple pressure hydraulic riveting machine, a hydraulic overhead crane, accumulators, pressure pumps, a hydraulic jib crane and a patent circular flanging machine; Lookout Boiler & Mfg. Co., Chattanooga, Tenn., hydraulic flanging press; Darbyshire-Harvie Iron & Machine Co., El Paso, Tex., sectional flanging press, accumulator, duplex pressure pumps and a hydraulic jib crane; Canada Foundry Co., Ltd., Toronto, Canada, a riveter.

Fires:—

The Ewald Iron Works, Louisville, Ky., was damaged to the extent of $200 Jan. 31.

The machine shop of Wheeler & Twine, Eighteenth street, Brooklyn, suffered a loss of $8,000 by fire Jan. 31.

The plant of the Boston & Lockport Block Co., East Boston, manufacturer of marine pumps and blocks, was partially destroyed by fire recently, entailing a loss of $100,000.

The Federal Signal Works, of Green Island, N. Y., was entirely destroyed by fire Jan. 31, causing an estimated loss of $200,000. A large part of the loss was in machinery and appliances.

TRADE PUBLICATIONS.

The Wellman-Seaver-Morgan Co., Cleveland, is distributing a pamphlet illustrating and describing the Hughes continuous gas producer. A number of types are illustrated, including the self-cleaning and the mechanically poked gas producers. Drawings and specifications for complete installations are also incorporated.

The Cleveland Twist Drill Co., Cleveland, has issued catalog 32 containing descriptions, illustrations and dimensions of a complete line of drills, reamers, sockets, cutters, arbors, etc. The catalog consists of 175 6 x 9 pages, with flexible covers, and presents a large amount of useful information regarding the class of tools listed.

The Chicago Pneumatic Tool Co., Chicago, is distributing upon request catalog No. 21, devoted to air cooled Duntley electric tools. These tools comprise blowers, grinders, drills etc. In addition, the catalog presents considerable information regarding the care of electric tools and the construction and operation of the motors used therein.

The Ingersoll-Rand Co., New York, in catalog No. 91 describes the Davis calyx diamondless core drill. This is a prospecting drill which produces cores from 1 5-8 to 15 inches diameter from any depth to 6,000 feet. It is built in different sizes ranging from a hand operated drill to one requiring 20 or more horsepower. The catalog contains 62 pages with illustrations and descriptions in detail of the various types of drills.

The Atlas Engine Works, Indianapolis, has issued Bulletin No. 134, containing illustrations and specifications of its steam engines and boilers. The various types of engines and boilers are classified and illustrated, and a brief summary of each engine and boiler, stating equipment, etc., is given below the specifications.

Wendell & MacDuffie, 26 Cortland St., New York, are distributing a 24-page catalog describing reinforced asbestos corrugated sheathing a strong and durable composition of asbestos and cement compressed and reinforced with woven iron mesh, which material is used as a substitute for corrugated iron.

The Garvin Machine Co., Spring & Varick Sts., New York, is distributing two circulars illustrating, respectively, motor-driven milling machines and vertical spindle milling machines. The motor-driven machines are of the universal and plain type, the universal being made in two and the plain in three sizes. Two different patterns of the vertical spindle machines are illustrated with tables 20 x 36 and 25 x 48 inches, respectively.

The Osborn Mfg. Co., Cleveland, manufacturer of foundry supplies and hardware specialties, has just issued a 200-page catalog describing and illustrating a large range of foundry tools and specialties, including ladles, molders' tools, brushes, wheel barrows, flasks, barrels, etc.

The Detroit Seamless Steel Tubes Co., Detroit, is distributing a booklet entled "Do You Know?", which presents a number of interesting historical facts and also the merits of the Detroit flue.

The Perfection Spring Co., Cleveland, is distributing a booklet containing a number of testimonials of the perfection steel spring for automobiles.

The Whiting Foundry Equipment Co., Harvey, Ill., has issued a bulletin containing illustrations of a number of installations of cranes of all types for railroad service.

The Michigan Sprocket Chain Co., Detroit, has brought out general catalog No. 5, which is bound in buckrum and contains 248 pages. Full price lists, dimensions and illustrations are given of the various kinds of chain manufactured, elevator equipment, etc.

The Lake Erie Nail & Supply Co., 412 Frankfort avenue, N. W. Cleveland, is distributing literature calling attention to excelsior high speed tool steel giving directions for hardening, forging and annealing. It also calls attention to high speed drills of "Excelsior" high speed steel, which are made in sizes from ¼ to three inches diameter varying by 64ths.

A NEW SELLING AGENCY.

The American Refractories Co., of Joliet, Ill., has become interested with the Olive Hill Fire Brick Co., of Olive Hill, Ky., and will hereafter have a joint selling agency with it in Chicago, in the New Commercial Bank Building. As this building will not be completed until May 1, all business until then will be transacted from the works office of the American Refractories Co., at Joliet.

The Olive Hill Fire Brick Co. has the original and largest plant for the manufacture of high grade fire brick, from the well known fire clays of Carter county, Ky. Being a strictly independent concern, the quality and the output is watched closely, and experienced and careful attention is given all orders, by E. S. Hitchens, the president, who attends to the management personally. The "Olive Hill" and "Carter" brands of brick have already established a well known reputation, through extensive use in blast furnaces, rolling mills, and among the general trade. The American Refractories Co., which completed last summer a large plant for the manufacture of high grade silica brick, described in the IRON TRADE REVIEW of Oct. 18, 1906, has met with success in marketing its "American" brand of silica brick, and is already enlarging its plant, to meet the increased demands. The Wisconsin ganister, from which these brick are made, seems to possess unusual qualities of refractoriness and strength, that are quite different from the silica brick heretofore made.

E. M. Allen, vice president and general manager of the American Refractories Co., will be in personal charge of this new selling agency, and it is believed that this combination of high grade silica and fire clay brick will be very successful.